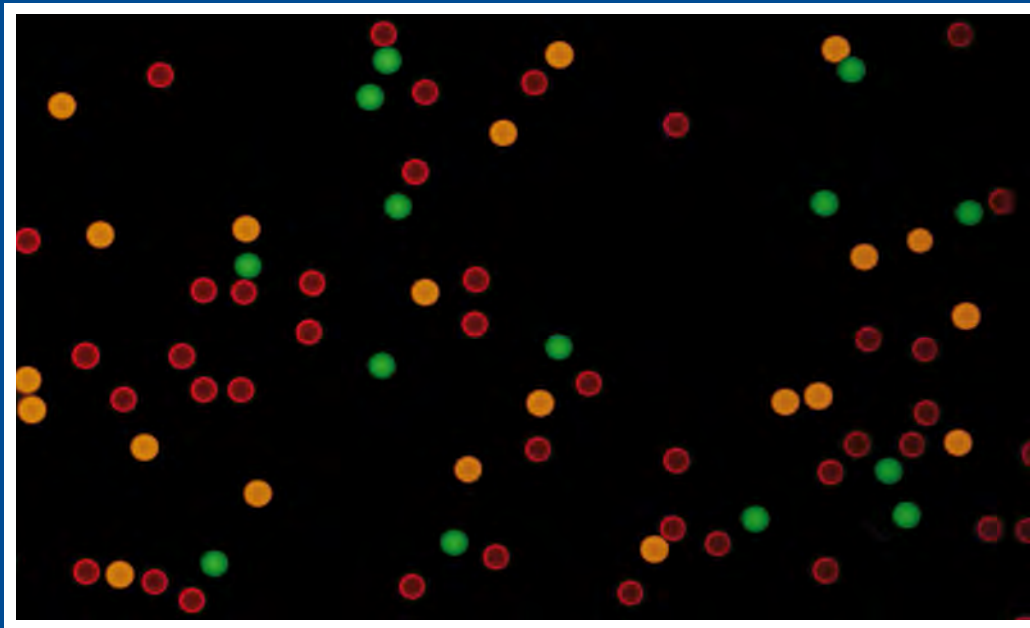
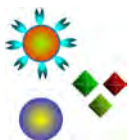


# PMMA Microparticles & Submicron Particles



# PolyAn

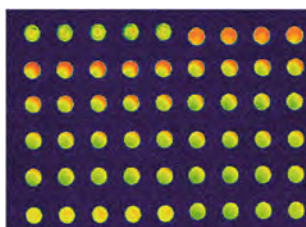
molecular  
surface  
engineering



## Molecular Surface Engineering since 1996

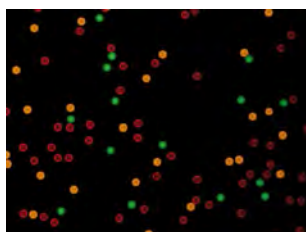
PolyAn is a nanotechnology company specialized in the modification of surfaces using Molecular Surface Engineering (MSE). Since 1996 PolyAn develops and manufactures high-performance consumables for multiplex diagnostics and LifeScience research.

### Consumables for Microarrays



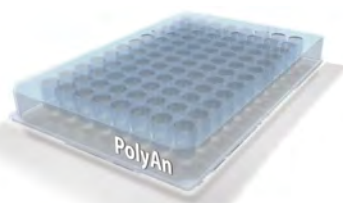
PolyAn is one of the leading producers of functionalized substrates for microarrays. Our wide range of surfaces, substrates and handling tools for microarrays enables our customers to select the most suitable substrate for their specific application.

### Microparticles & Submicron particles



PolyAn is offering a portfolio of monodisperse poly methyl methacrylate (PMMA) microparticles (beads) for multiplex bead assays, calibration of flow cytometers and calibration of fluorescence imaging systems. PolyAn's microparticles can be colour encoded with a wide range of fluorescent dyes and functionalized with PolyAn reactive 3D-matrices.

### Functionalized Microplates for Immunoassays



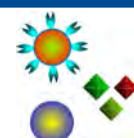
PolyAn's microplates are used for covalently immobilizing biomolecules that inefficiently coat by passive adsorption. PolyAn offers Amine binding, 3D-Azide and Streptavidin coated 96-well plates for challenging ELISA applications.



### Calibrations Tools for Fluorescence Imaging Systems

Re-usable calibration tools for fluorescence based detection systems. PolyAn's calibration slides for cell assays can be used as quality controls in a number of IVD systems for immunology applications.

**Molecular Surface Engineering Services:** PolyAn is able to equip almost any substrate with our reactive matrices for selective immobilization and antifouling surfaces for the reduction of cell adhesion and unspecific binding, respectively. As part of our Molecular Surface Engineering services, we offer functionalized consumable and substrate materials for OEM applications, which are tailored to specified customer requirements.





## Microparticles & Submicron Particles

PolyAn is offering a portfolio of monodisperse poly methyl methacrylate (PMMA) microparticles and submicron particles for multiplex bead assays, agglutination assays, cell staining, calibration of flow cytometers and calibration of fluorescence imaging systems as well as a wide range of other applications in LifeScience research.



### Microparticles

<b>Size</b>	2–20 $\mu\text{m}$
<b>Uniformity</b>	monodisperse, CV 2.5–5 %
<b>Colour/Encoding</b>	Fluorophores at different intensities Up to six fluorophores in one bead Transparent beads
<b>Molecular Surface Engineering</b>	Low Aggregation Surface 3D-Carboxy, 3D-Alkyne, 3D-Azide (click-chemistry), 3D-Aldehyde, Streptavidin, Neutravidin, Biotin, Protein A/G, Poly-L-Lysine, Oligonucleotides, Peptides, Antibodies

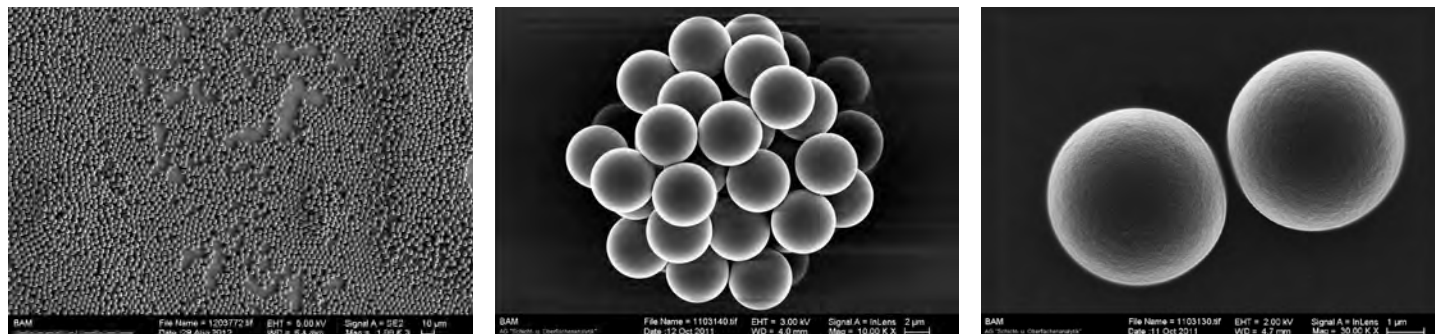
### Submicron Particles

<b>Size</b>	100–500 nm
<b>Colour/Encoding</b>	Single fluorophores at different intensities Multiple fluorophores in one bead Transparent beads
<b>Molecular Surface Engineering</b>	Carboxy, Aldehyde

PolyAn's particles can be colour encoded with fluorescent dyes. The fluorophores are directly incorporated into the core of the bead during the particle formation. This ensures a homogeneous distribution of the fluorophores within the bead and improves the stability of the fluorophores. PolyAn's particles are functionalized using our proprietary Molecular Surface Engineering (MSE) Technology. PolyAn's reactive matrices are suitable as a platform for a wide range of coupling methods. Our microparticles are characterized by low non-specific adsorption and low aggregation behaviour.

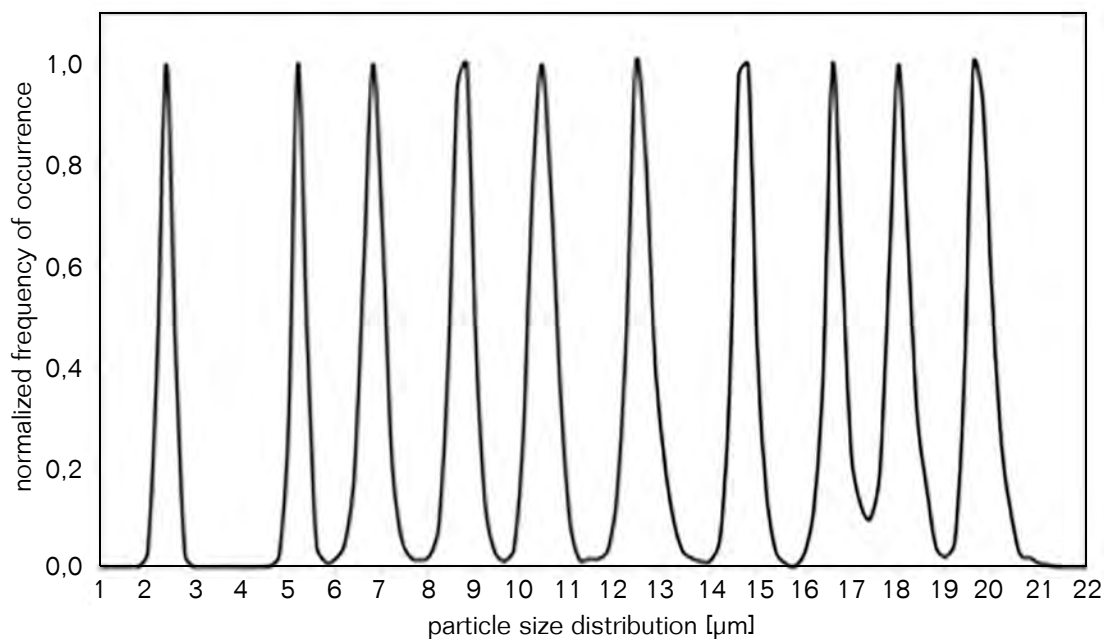
## Polymer Microparticle Characteristics

Our polymer microparticles are based on a PMMA core with nanoscale 3D-surface modification.

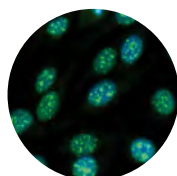


SEM images of different types of microparticles

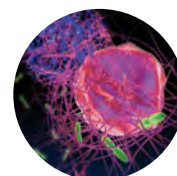
Using PMMA ensures an excellent optical brilliance and a low autofluorescence compared to other microparticle materials. The refractive index of 1.48 is close to the refractive index of cells (ca. 1.38). Our microparticles have a density of 1.19 g/cm<sup>3</sup> and a glass transition temperature (T<sub>g</sub>) of about 110°C. PolyAn uses a biocompatible grade of PMMA.



Escherichia Coli, 1–2 µm\*



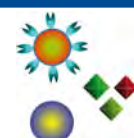
HEp2-Cell, 10 µm\*\*



Macrophage, 20 µm\*\*\*

PolyAn produces microparticles in the range between 2–20 µm. Each bead population is monodisperse with a maximum Coefficient of Variation (CV) of less than 5%.

Imagesources: \*Agricultural Research Service, Wikimedia Commons, \*\*Medipan GmbH, \*\*\*Universität Potsdam

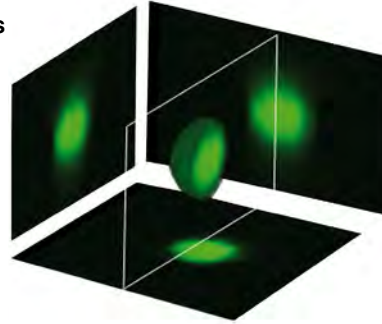




## Fluorescence encoding Tool Box

With PolyAn's production process the fluorophores are incorporated into the beads during the formation process. This ensures a much more homogeneous distribution of the dyes within the beads when compared to conventional diffusion controlled dyeing processes. Additionally, the fluorophores are caged within the polymeric PMMA matrix and thus less likely to leak-out.

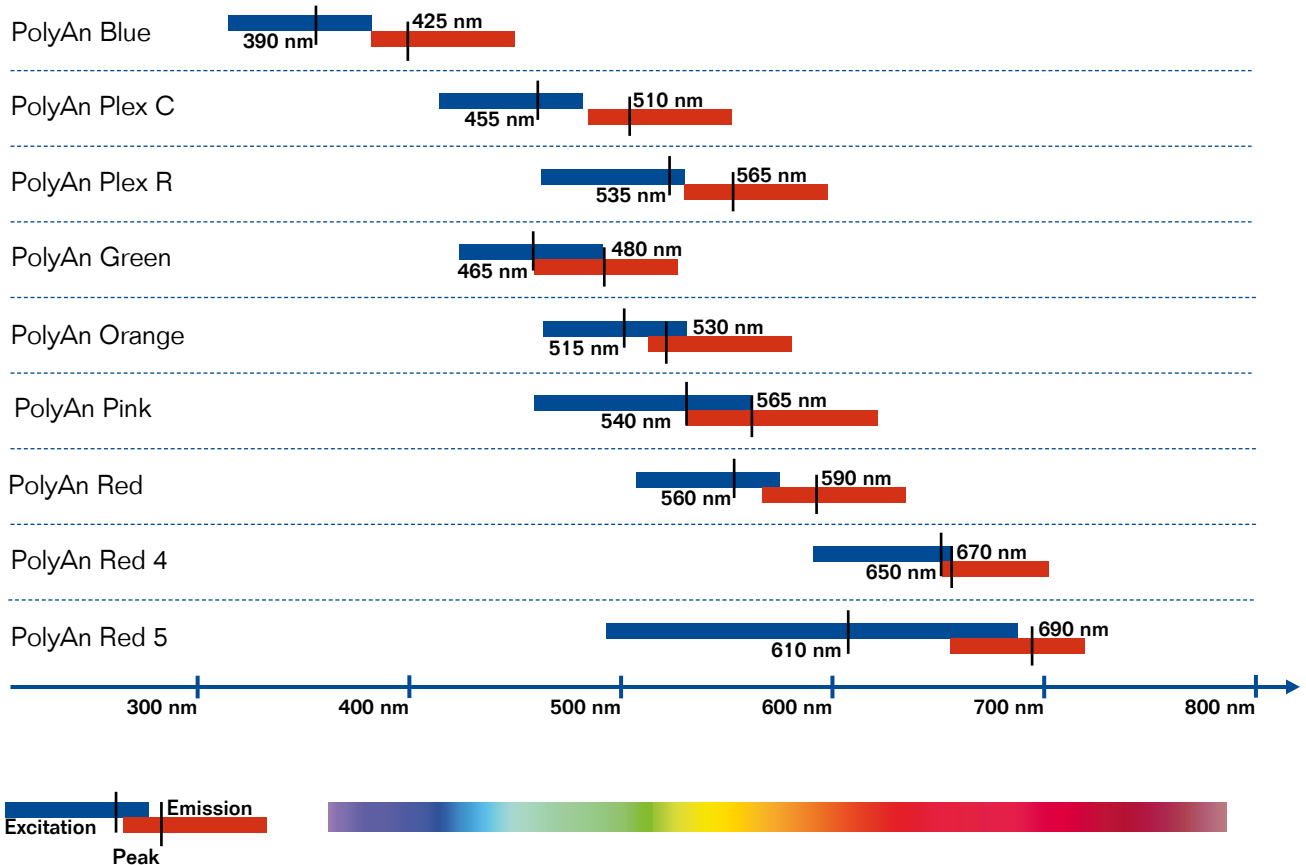
### Homogenous distribution of fluorophores



Confocal Laser Scanning Microscope (CLSM) image, 3D-Z-stack of PolyAn Orange bead\*

### Available fluorophores

PolyAn uses a wide selection of fluorophores with emissions ranging from the violet to the near-infrared. The fluorophore concentration and thus the fluorescence intensity can be controlled in a wide range. Additional dyes for specific requirements are available upon request. Please do not hesitate to contact us to find a suitable fluorescence encoding for your application.



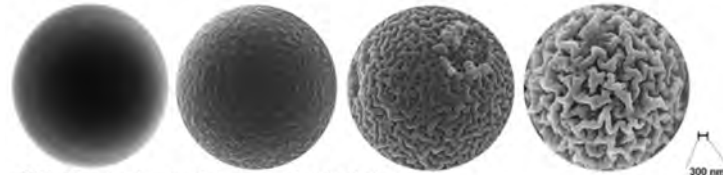
\* Image courtesy of Bundesanstalt für Materialforschung und -prüfung (BAM)



## Molecular Surface Engineering

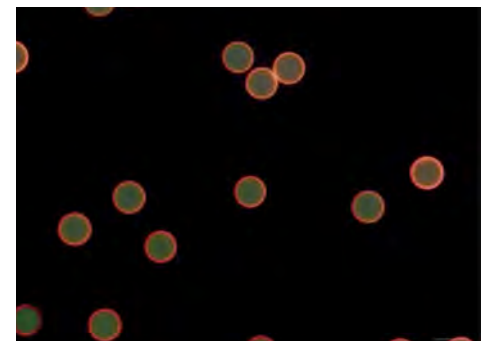
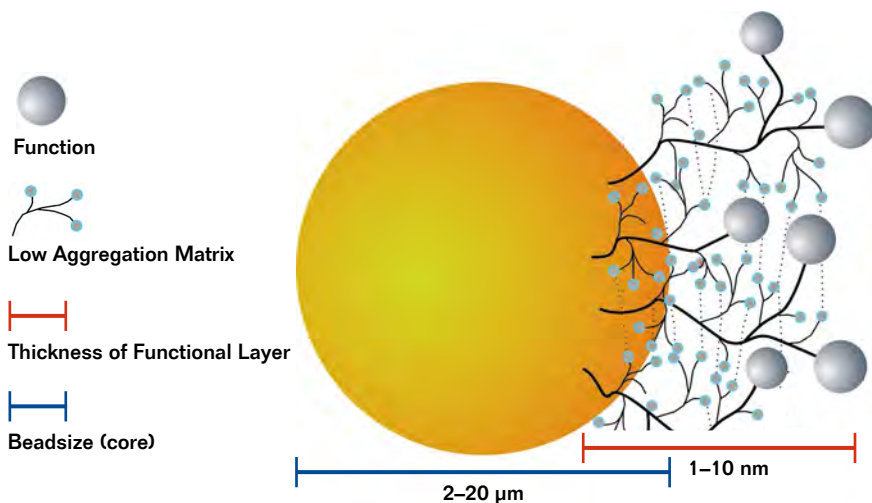
PolyAn's high-performance polymer microparticles are functionalized with a 3D-surface chemistry comprised of a long-chain polymer with a defined number of reactive groups. In contrast to conventional coating procedures, the reactive polymer is covalently linked to the surface.

### PMMA microparticles/microspheres



REM: different surface morphologies of carboxylated microspheres

By using MSE-technology, a thin polymer shell of a few nanometers, consisting of functional groups, is formed on the surface. This occurs without changing the excellent physical and optical properties of the PMMA-core. Our 3D-funktionalized-particles are suitable for covalent coupling of molecules or for ionic interaction.



Olympus, 60x: dyed functional surfaces on beads

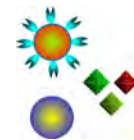
Schematic model of the 3D reactive matrix on the core polymer microparticle

PolyAn offers the following surfaces for immobilization of probes, e.g. DNA, peptides and proteins:

- 3D-Carboxy for EDC/EDAC mediated coupling
- 3D-Aldehyde for one-step binding of biomolecules
- 3D-Alkyne and 3D-Azide for „click chemistry“
- Streptavidin and Neutravidin for coupling of biotinylated biomolecules
- Poly-L-Lysine for attachment of cells and proteins
- Protein A/G for binding of IgG

Unspecific binding and aggregation of biomolecules is reduced by our low aggregation matrix. Our rigorous quality control procedures according to ISO 9001 ensure the constant loading and low batch-to-batch variation necessary for molecular diagnostics and pharma screening.



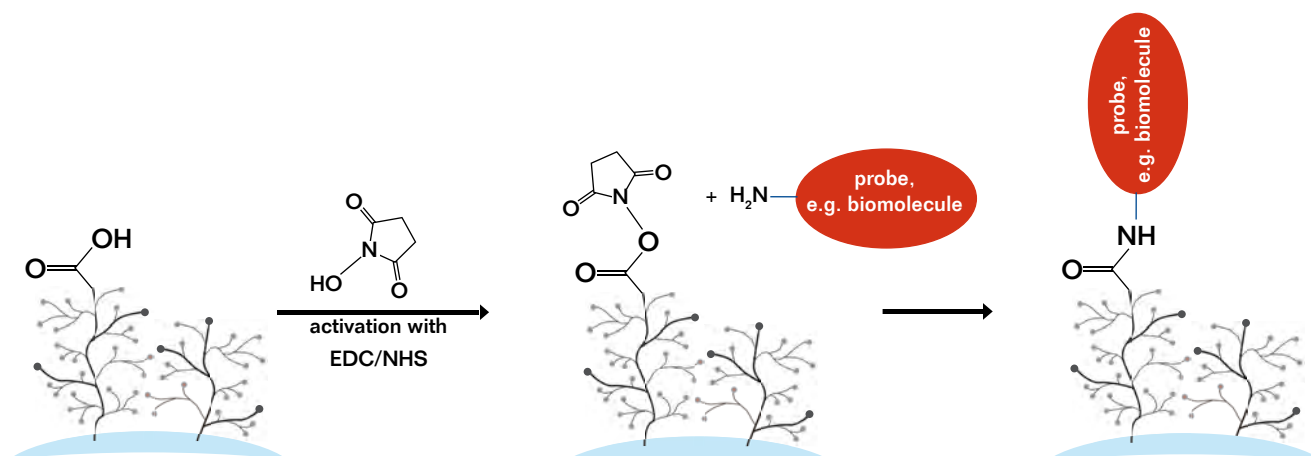


PolyAn offers the following surfaces for immobilization of oligonucleotides, aptamers, peptides, glycans and proteins or others:

Functional Group	Structure	Application examples
<b>3D-Carboxy</b>		... for EDC/EDAC mediated coupling of proteins or amine-terminated peptides
<b>3D-Aldehyde</b>		... for Amines, Hydrazines and Aminoalkoxyacetyl modified biomolecules
<b>3D-Alkyne</b>	$-\text{C}\equiv\text{CH}$	... for binding of Azide-modified biomolecules via copper-catalyzed click-chemistry
<b>3D-Azide</b>	$-\text{N}^{\ominus}-\text{N}^{\oplus}\equiv\text{N}$	... for binding of molecules via click-chemistry
<b>3D-Cyclooctine (DBCO)</b>		... for binding of Azide-modified biomolecules via copper-free click-chemistry
<b>3D-Maleimide</b>		... for binding of Thiol containing molecules
<b>PEG-Biotin</b>		... for coupling of Streptavidin or Neutravidin conjugated biomolecules
<b>Sreptavidin or Neutravidin</b>		... for coupling of Biotinylated biomolecules
<b>Antibody</b>		... for antigen binding and detection
<b>Poly-L-Lysine</b>		... activated Carboxy-group containing molecules, or electrostatic adsorption of negatively charged species
<b>Protein A/G or Protein G</b>		... for binding of IgG
<b>Low Aggregation</b>		... non-adsorbing matrix, for calibration, for controls

## 3D-Carboxy surfaces for EDC/EDAC mediated coupling

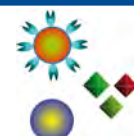
PolyAn's 3D-Carboxy-microparticles with antifouling behaviour are suitable for coupling of proteins and antibodies or amine terminated peptides and other molecules.



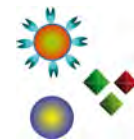
The reaction of carboxyl groups with N-hydroxy succinimide leads to highly reactive esters, which can be easily reacted with nucleophiles e.g. Amines, Hydrazines. The NHS-ester reacts immediately with the NH<sub>2</sub>-functional groups of biochemical species to form a covalent bond with the surface.

### Key features

- Easy activation using EDC/EDAC
- Generating NHS surface as an intermediate step, sequential coupling is possible
- Amine-containing biomolecules covalently bind to activated Carboxy surface
- Low concentration of Amine-containing biomolecules are possible
- A stable covalent bond between the surface and the biomolecules is formed, i.e. no leaching can occur

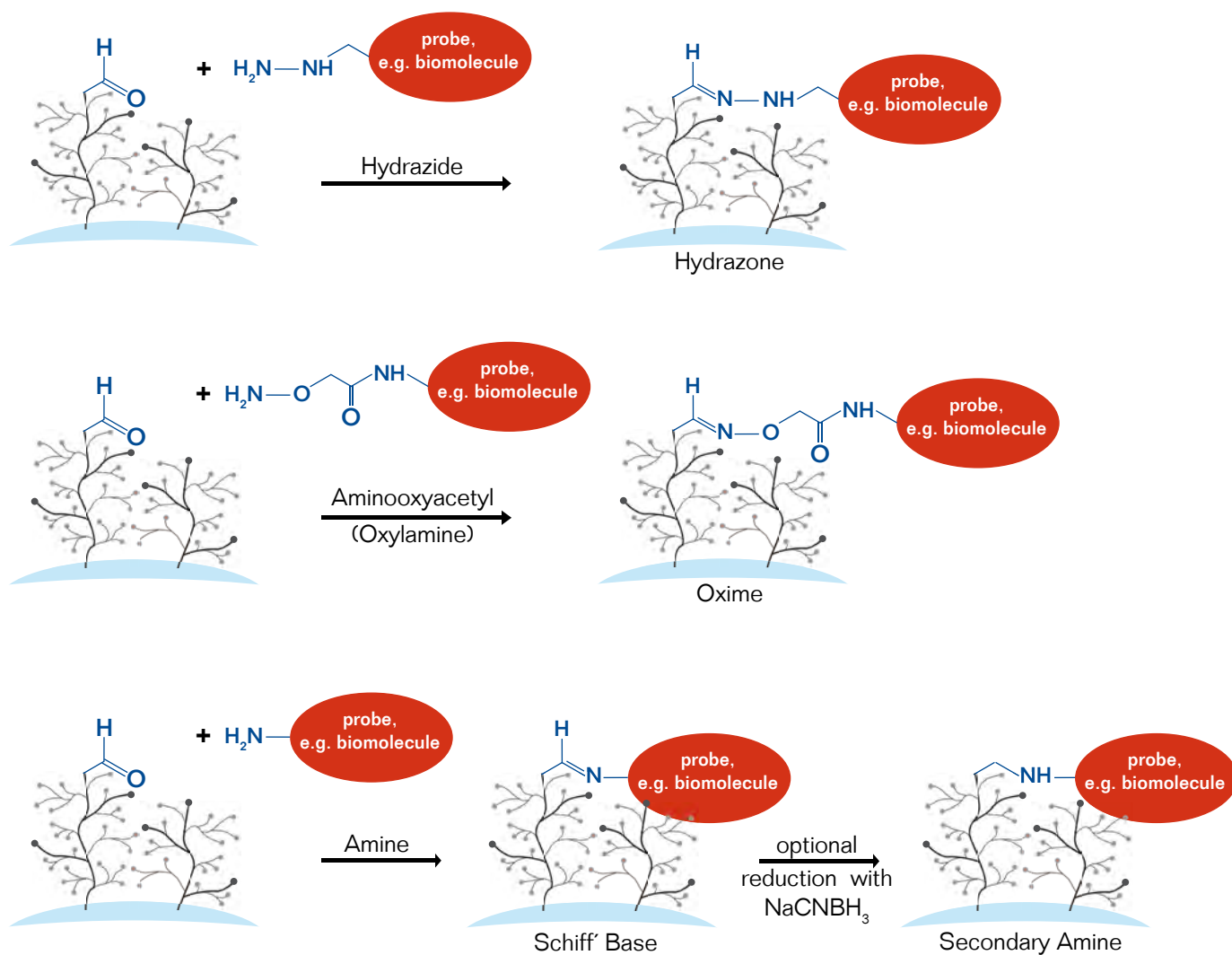






## 3D-Aldehyde functionalized beads for direct coupling of biomolecules

Aldehyde groups react immediately with the  $\text{NH}_2$ -groups or other suitable functional groups of the probe to form a covalent bond with the surface. Thus, no activation of the bead surface is necessary prior to binding of the probe. The 3D-Aldehyde matrix has an integrated spacer structure to ensure optimal binding conditions. If necessary, the loading with Aldehyde groups can be adapted to the specific application.



### Key features

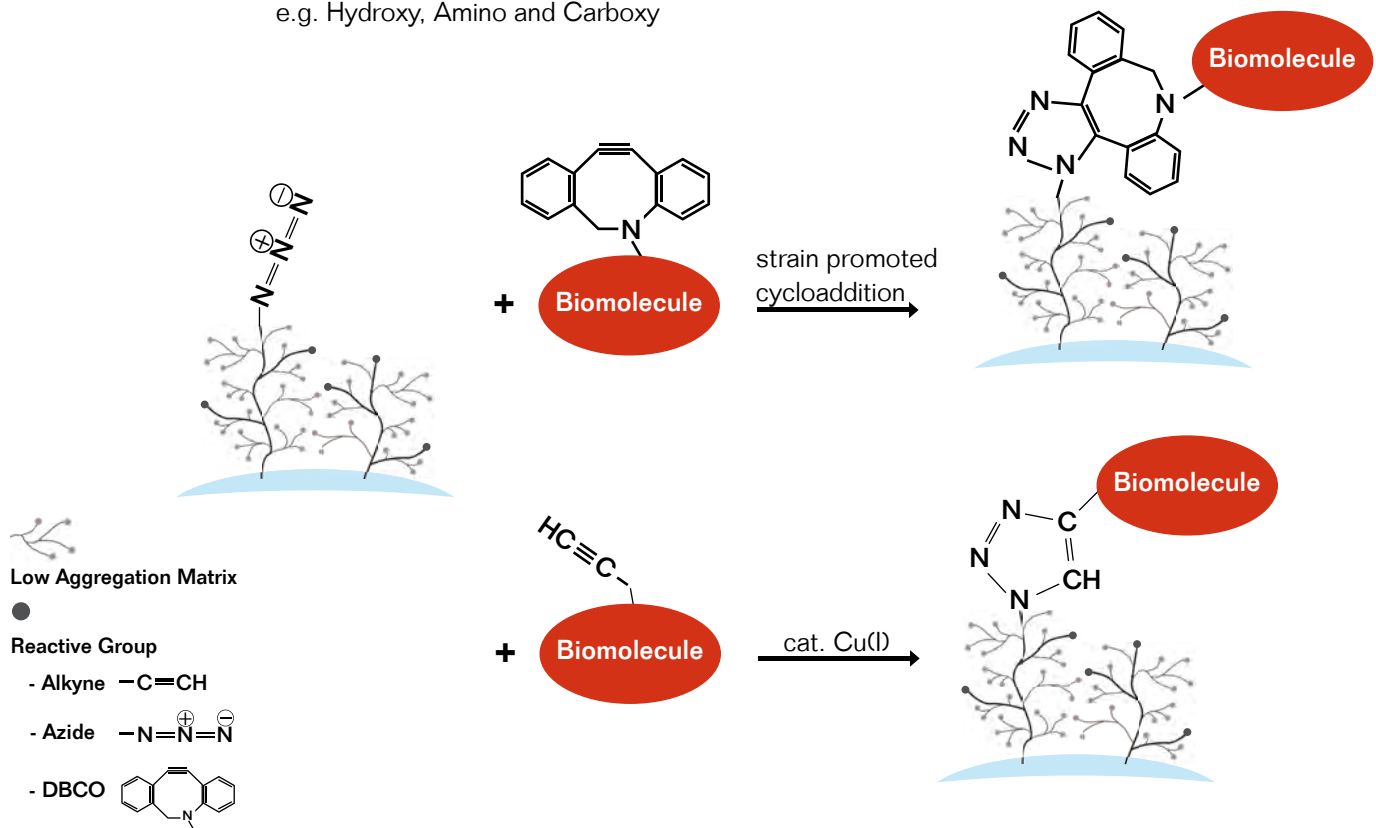
- Aldehyde groups bind to amines, hydrazines and aminoalkoxyacetyl modified biomolecules
- No activation of surface with e.g. glutaraldehyde necessary
- Suitable for one-step coupling of biomolecules
- Gentle immobilization without cross-linking of biomolecule
- Attached biomolecules can be stabilized by reducing the imines with sodium borohydride

A. Roloff et al, Quantification of Aldehydes on Polymeric Microbead Surfaces via Catch and Release of Reporter Chromophores, *Analytical Chemistry* 2019, 91, 14, 8827-8834

## Surfaces for Click Chemistry

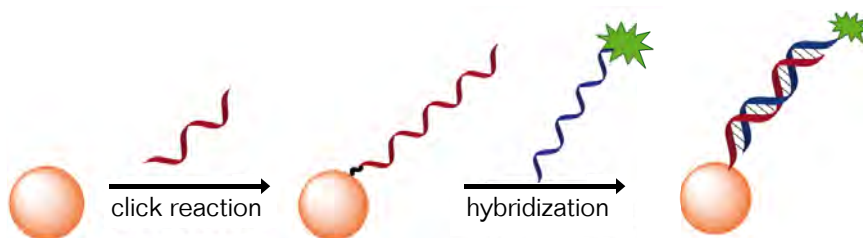
PolyAn has developed new 3D-Alkyne and 3D-Azide surfaces for oriented and bio-orthogonal coupling of biomolecules:

- Alternative to conventional Streptavidin-Biotin coupling
- Less unspecific interactions compared to Streptavidin
- No reactions of Alkyne or Azide with regular biomolecule functionalities, e.g. Hydroxy, Amino and Carboxy



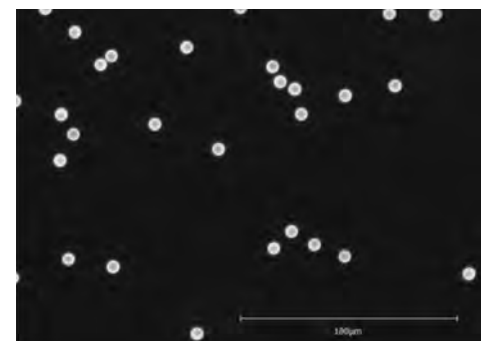
## Directed coupling of Oligonucleotides and Peptides

As part of our functionalization services PolyAn is now offering the custom modification of beads with oligonucleotides or peptides.



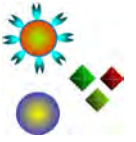
5  $\mu\text{m}$  fluorescent PMMA beads with capture oligonucleotide immobilized via copper-free click chemistry

- Hybridization e.g. with 6-FAM labelled anti-strand as shown in adjacent image



Olympus, 20x: Fluorescence image after hybridization



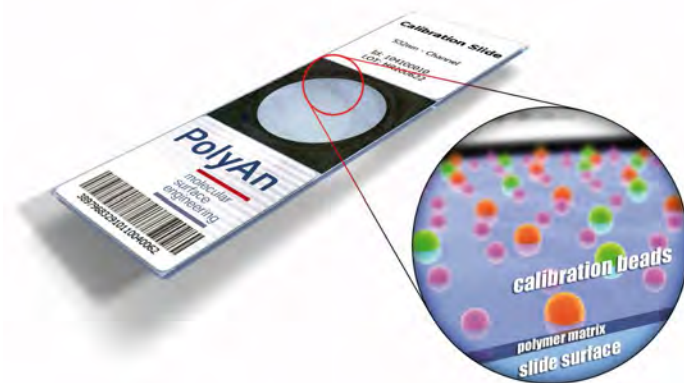


## Fluorescence Calibration Slides

- For the routine calibration of fluorescence microscopes
- For automated fluorescence imaging systems, e.g. scanning cytometry

PolyAn's calibration slides are designed for the routine calibration of confocal fluorescence microscopes and other fluorescence imaging systems. They are prepared by mounting statistically distributed monodisperse PMMA beads that contain ultra-stable fluorophores onto standard 75 x 25 x 1 mm glass slides. The beads are protected from mechanical stress with a coverglass.

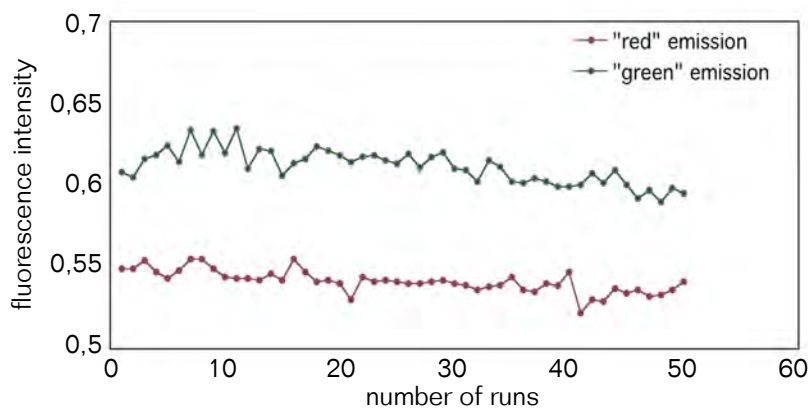
### Available for three different emission wavelengths



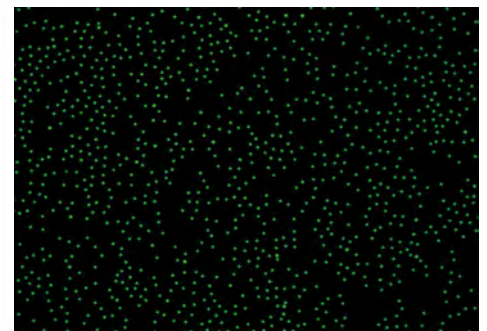
- Blue emission channel e.g. DAPI
- Green emission channel e.g. FITC, Cy3®
- Red emission channel e.g. APC, Cy5®

### Characteristics

- Monolayer of fluorescent beads on glass slides
- High photostability
- Homogeneous particle size and fluorescence intensity
- Single particles, no particle aggregates and homogeneous, statistical particle distribution
- Excellent slide-to-slide and batch-to-batch reproducibility, CV < 3%
- Long term stability: less than 0.5% decrease in fluorescence intensity after 1 month at 37°C
- Standard size: 75 x 25 x 1 mm glass slides, alternative formats are available upon request



**Photostability:** slides mounted with "Green" and "Red" emitting beads were measured multiple times over a period of 50 days. The fluorescence intensity after more than 50 measurements exceeded 97% of the initial intensity for both dyes, underlining their excellent photostability.

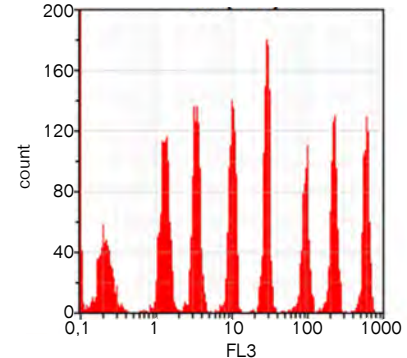
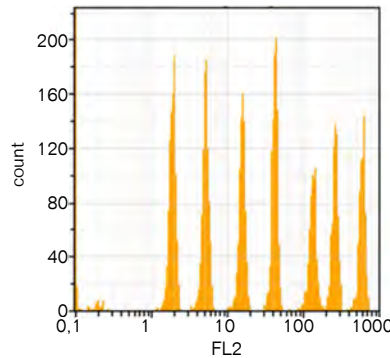
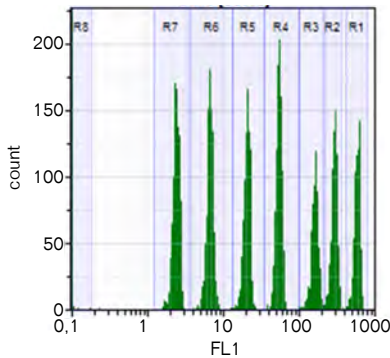


Fluorescence image of a calibration slide (green channel): homogeneous particle distribution, no aggregates.

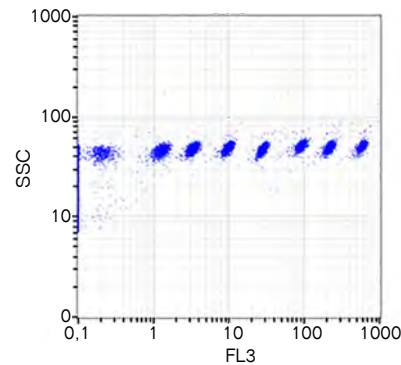
\* Cy® is a trademark of Amersham Biosciences Corp.

## Spectrum Calibration Beads

PolyAn's **Spectrum Calibration Beads** are designed for calibration of flow cytometers and other fluorescence imaging systems. Each color encoded PMMA bead population (peak) contains a mixture of fluorophores that allows performance validation at all wavelengths.



**8-peak Spectrum Calibration Beads with increasing fluorophore content for all channels. One transparent population (only in FL3 detectable) and 7 fluorescence encoded populations. Measurement with QA Quantum P flow cytometer. Excitation laser line at 488 nm.**



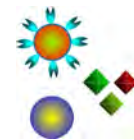
### Key features

- Contains a mixture of fluorophores that enable the Spectrum Calibration Beads to be excited at any wavelength from 365 nm to 650 nm.
- Fluorophores are homogeneously encapsulated in the PMMA matrix. Special shell prevents leaching of fluorophores.
- Allows the calibration of the FITC, PE, PE-TR, PE-Cy5, and APC channels with the same set of particles.
- Set of up to 8 similar size microparticle populations (peaks) with different fluorescence intensities.

Product-ID	Description
107 02 006	Spectrum Flow Cytometer Calibration Beads, 1 population (peak)
107 01 006	Spectrum Flow Cytometer Calibration Beads, 5 populations (peaks)
107 00 006	Spectrum Flow Cytometer Calibration Beads, 8 populations (peaks)

Individual packaging, other sizes and alternative fluorescence intensities (peaks) are available upon request. Please contact our customer service for a custom development.





## Microparticles for Scanning Cytometry

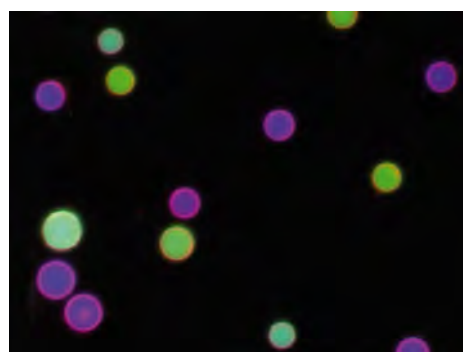
For fluorescence microscopy based detection systems PolyAn has developed several sets of multiplex beads that can be distinguished by both different sizes as well as different colour encodings. In order to facilitate detection and reduce the requirements with regards to the optical system, these multiplex beads are larger and have a higher fluorescence intensity.

### Example: AKLIDES® System

The AKLIDES detection platform consists of an inverse fluorescence microscope with a motorized scan stage.



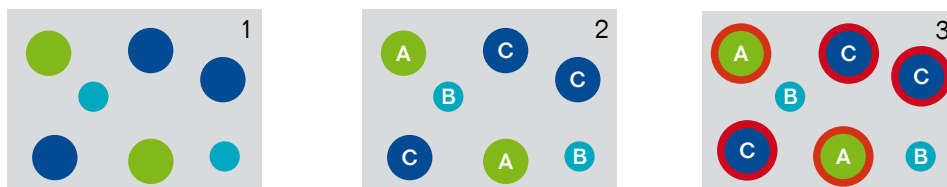
Slide during detection



Focused fluorescence encoded and labelled microparticles

### Classification, assignment and evaluation of multiplex beads

The images are detected by a CCD camera. The multi-colour fluorescence image-capture-based system uses pattern recognition algorithms for multiplex testing.



The bead populations are distinguished by their fluorescence and size, respectively. In the first step, the beads are focused by a dynamic autofocus (1). Subsequently, the beads are classified and assigned to their bead population (2). In the final step, the ligand fluorescence is detected using a fluorescence label illustrated by the red corona (3).

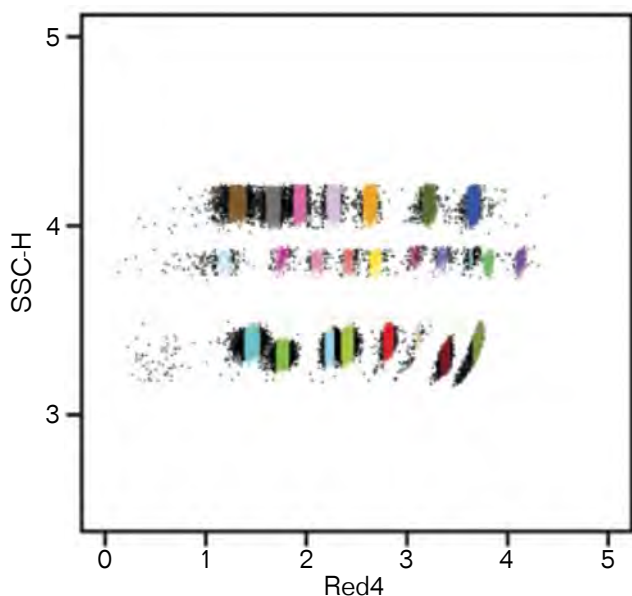
Product-ID	Diameter	Surface	Colour Labeling	Peaks	Excitation/Emission
105 02 011 105 02 015	11/15 µm	3D-Carboxy LA	Dual Colour	18	420–480 nm / 515–540 nm 485–540 nm / 535–570 nm
105 31 011 105 31 015	11/15 µm	Streptavidin	Dual Colour	18	420–480 nm / 515–540 nm 485–540 nm / 535–570 nm

Our PolyAn Plex beads are also available with 3D-Aldehyde, Neutravidin, Protein A/G, 3D-Azide and 3D-Alkyne surfaces. A custom modification with antibodies or oligonucleotides is available upon request.

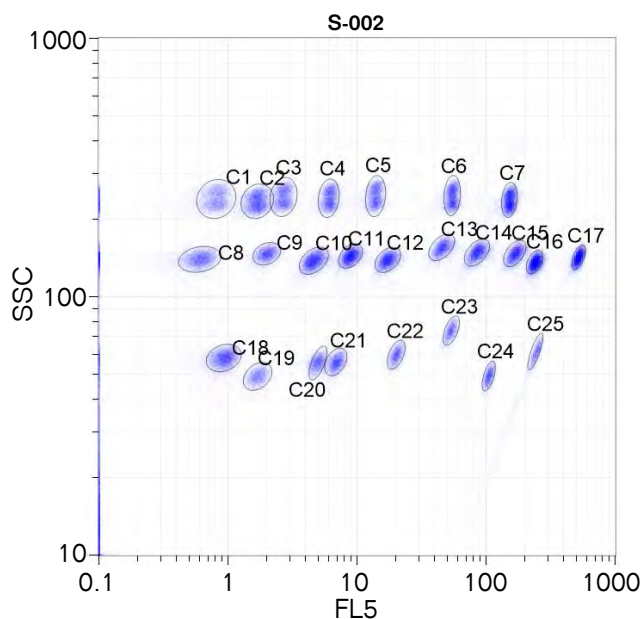


# Microparticles for Flow Cytometry

Single Dye encoded beads for multiplex assays – 25 Plex



PolyAn Red4 Plex Beads: Detection of 25-plex (three sizes with 7-10 different fluorescence intensities) with BD FACSCanto II\*



PolyAn Red4 Plex Beads: Detection of 25-plex with Quantum P Flow Cytometer\*\*

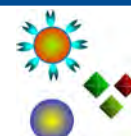
PolyAn Plex bead kits provide a platform for the design of multiplexed suspension arrays that can be run on standard flow cytometers. PolyAn offers a 25 Plex (peaks) set of beads that can be distinguished by both different fluorescence intensities of our PolyAn Red4 dye (Excitation: 590–680 nm/Emission: 660–780 nm) as well as three different sizes (3.5 µm, 5.5 µm and 8.5 µm).

## PolyAn Red4 25 Plex

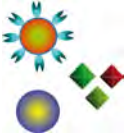
Product-ID	Diameter	Surface	Colour Labeling	Peaks	Excitation/Emission
106 50 003	3.5 µm	3D-Carboxy LA	PolyAn Red4	8	590–680 nm/660–780 nm
106 50 005	5.5 µm	3D-Carboxy LA	PolyAn Red4	10	590–680 nm/660–780 nm
106 50 009	8.5 µm	3D-Carboxy LA	PolyAn Red4	7	590–680 nm/660–780 nm
106 52 003	3.5 µm	Streptavidin	PolyAn Red4	8	590–680 nm/660–780 nm
106 52 005	5.5 µm	Streptavidin	PolyAn Red4	10	590–680 nm/660–780 nm
106 52 009	8.5 µm	Streptavidin	PolyAn Red4	7	590–680 nm/660–780 nm

Our PolyAn Plex beads are also available with Neutravidin, 3D-Aldehyde, Protein A/G, 3D-Azide and 3D-Alkyne surfaces. A custom modification with antibodies, peptides or oligonucleotides is available upon request.

\* Images courtesy of Systems Immunology Lab (Humboldt Universität Berlin)  
 \*\* Image courtesy of Quantum Analysis GmbH

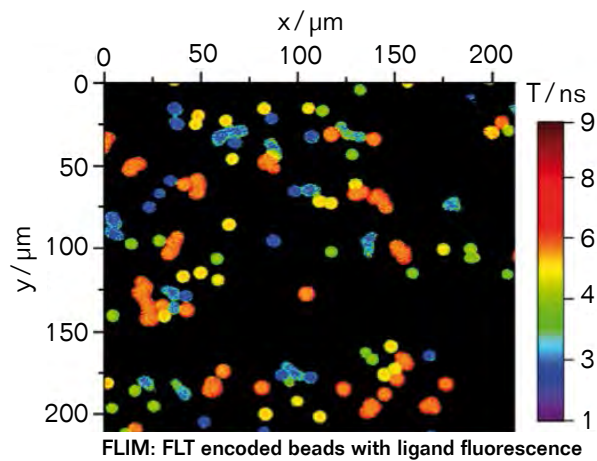




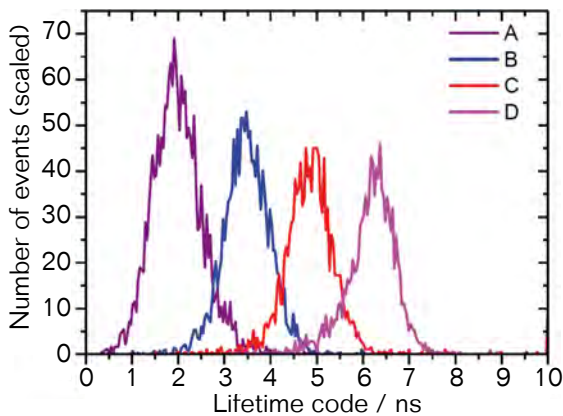


## Microparticles for Fluorescence Lifetime Applications

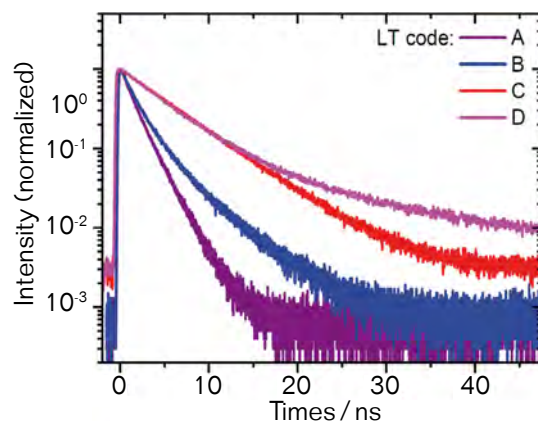
**Fluorescence-lifetime imaging microscopy** or **FLIM** is an imaging technique for producing an image based on the differences in the exponential decay rate of the fluorescence from a fluorescent sample. It can be used as an imaging technique in flow cytometry, confocal microscopy, two-photon excitation microscopy, and multi-photon tomography. PolyAn has developed fluorescence lifetime encoded beads (FLT beads) that can be distinguished according to their different fluorescence lifetimes.



### PolyAn FLT Beads



Histogramm: PolyAn FLT beads measured with a fluorescence lifetime flow cytometer



Decay curves of PolyAn FLT beads

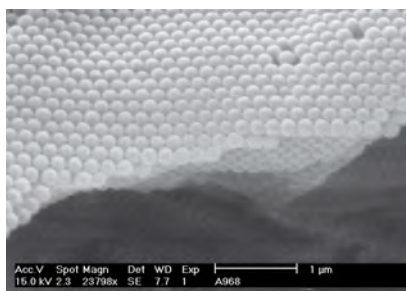
Product-ID	Diameter	Surface	Fluorescence Lifetime
110 00 006	6.5 $\mu\text{m}$	3D-Carboxy LA	1.7 ns
110 10 006	6.5 $\mu\text{m}$	3D-Carboxy LA	2.7 ns
110 20 006	6.5 $\mu\text{m}$	3D-Carboxy LA	5.5 ns
110 30 006	6.5 $\mu\text{m}$	3D-Carboxy LA	7.9 ns

Our PolyAn FLT beads are also available with 3D-Aldehyde, Streptavidin, Neutravidin, Protein A/G, 3D-Azide and 3D-Alkyne surfaces. A custom modification with antibodies, peptides or oligonucleotides is available upon request.

\* Images courtesy of Bundesanstalt für Materialforschung und -prüfung (BAM)  
D. Kage et al, Luminescence lifetime encoding in time-domain flow cytometry.  
*Scientific Reports (2018) 8: Article 16715*

## Fluorescent PMMA Submicron Beads

Our PMMA based submicron particles are available in sizes between 100 nm to 500 nm. They are characterized by a narrow particle size distribution (see SEM image below) and an excellent lot-to-lot reproducibility. PMMA submicron beads are non toxic und thus suited for live cell applications. Latex beads with Carboxy and Aldehyde for immobilization of biomolecules (proteins, antibodies, haptens, etc.) as well as plain beads are available.



SEM image of 170 nm PMMA-submicron beads forming a photonic crystal



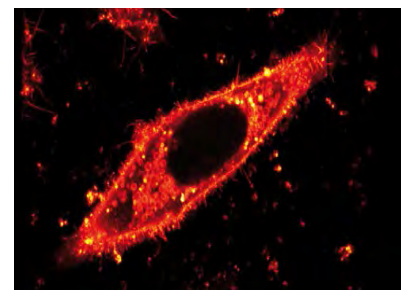
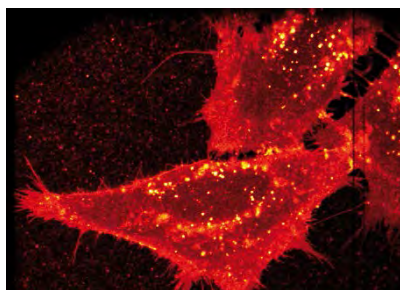
PMMA-submicron beads with tuneable spectral properties and high fluorescence intensity

### Applications

We offer a large range of different PMMA submicron beads suitable for bead based technologies, including:

- Immunoturbidimetric assays
- Solid phase immunoassays
- Nephelometric assays
- Calibration (e.g. flow cytometry, fluorescence microscopy)
- Cell staining / compartment staining

High resolution fluorescence images (STED)\* of cell staining using fluorescent PMMA-nanobeads

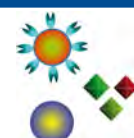


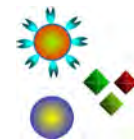
### Available characteristics

Choose from a wide range of different combinations of size, fluorescence encoding and surface modifications:

Select Size	Select Surface	Select Colour	Select Volume	Order at PolyAn
Size [nm]	Surface	Colour		
100–150	Plain	<u>Fluorophore</u>	<u>Excitation</u>	<u>Emission</u>
151–200	Carboxy	PolyAn Blue	350–400 nm	400–480 nm
201–250	Aldehyde	PolyAn Green	415–480 nm	470–550 nm
251–300		PolyAn Orange	450–535 nm	510–580 nm
301–350		PolyAn Pink	450–565 nm	540–620 nm
351–400		PolyAn Red4	590–680 nm	660–780 nm
401–450		PolyAn Red5	490–680 nm	660–730 nm
451–500				

\* Images courtesy BTU Cottbus-Senftenberg





# Fluorescent Submicron and Small Microparticles for Agglutination Assays

PolyAn offers functionalized submicron and small microparticles in the range of 100 nm to 2  $\mu\text{m}$  for agglutination assays.

## Application example

Overview



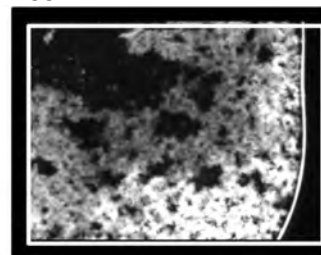
Submicron bead Suspension

Negative control



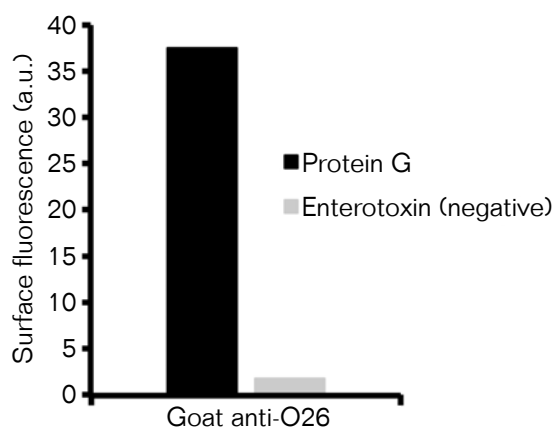
E. coli serotype O157 with submicron bead suspension coupled to anti-O26 antibody (10x magnification).

Agglutination



E. coli serotype O26 with submicron bead suspension coupled to anti-O26 antibody (10x magnification).

Submicron based agglutination assay for the differentiation between different E. coli serotypes: 130 nm submicron beads were coupled to a goat-antibody recognizing E. coli serotype O26. Subsequently, the submicron bead suspension was mixed with E. coli suspension containing serotype O157 (negative control) or O26. The suspensions were placed between a microscope slide and a cover slip. After a 5 min incubation, the suspension was analyzed with a fluorescence microscope at 488 nm.



Semi-quantitative verification of antibody presence on submicron bead surface: Submicron beads were mixed with protein G coupled microbeads (8  $\mu\text{m}$ ) or with enterotoxin coupled microbeads as negative control. The binding of the fluorescence labeled submicron beads on the microparticles was detected using a fluorescence microscope.

\* Data courtesy of BTU Cottbus-Senftenberg

## Our service: Customized Beads / Bead Populations with individual surface functionalization solutions

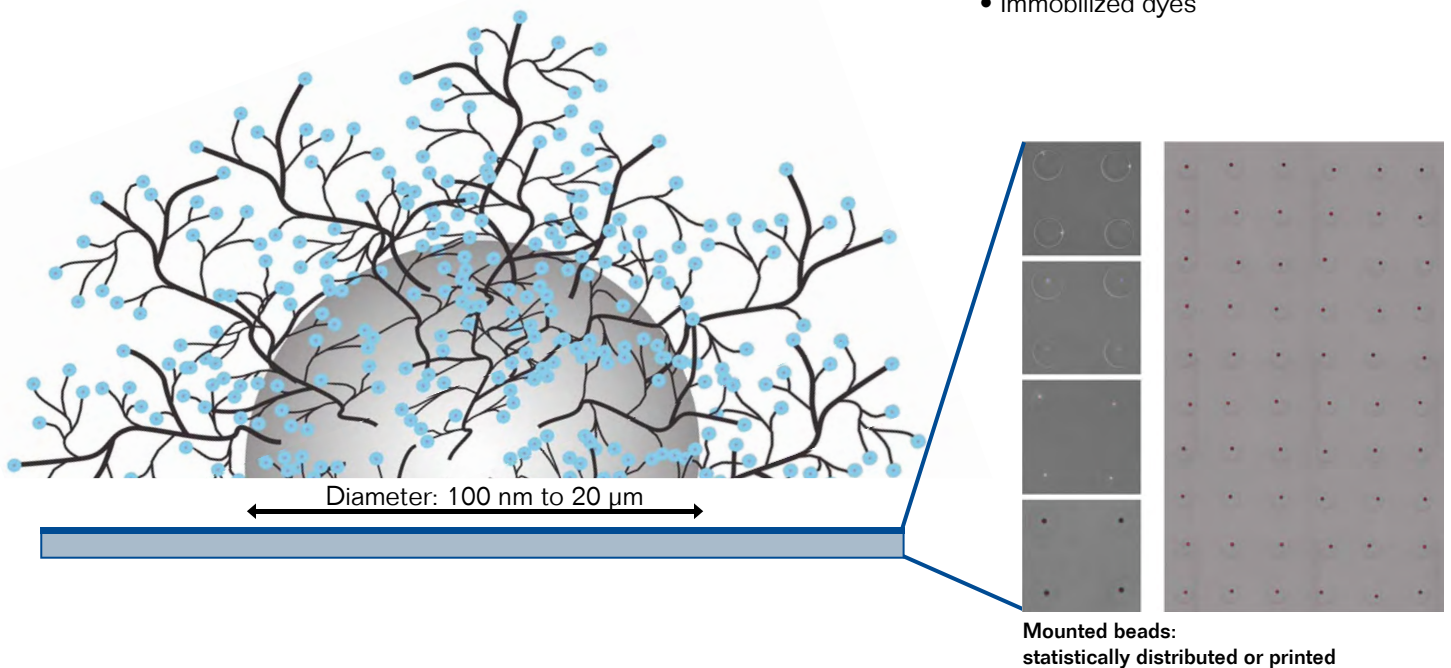
As part of our Molecular Surface Engineering Services, we offer the individual development of beads for specific requirements.

### Core / Bead

- Transparent
- Fluorescent
  - Customized colour, excitation / emission
  - Single dye
  - Multiple dyes
  - Customized fluorescence intensity
  - Fluorescence lifetime
  - Multiplex encoding
  - Calibrated brightness

### Shell / Surface

- Unmodified
- Low Aggregation
- Functionalized
  - 3D-Carboxy
  - 3D-Alkyne
  - 3D-Azide
  - Streptavidin / Neutravidin
  - Poly-L-Lysine
  - Protein A/G
  - Antibodies
  - Peptides
  - Oligonucleotides
- Immobilized dyes

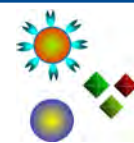


Custom product development is the cornerstone capability from which PolyAn's family of products evolved. PolyAn has developed a broad repertoire of bead manufacturing capabilities that meet customer specifications with regards to tolerances, bio-compatibility, and assay conditions.

Our scientists partner with our customers to rapidly build prototypes that enable scaled development and manufacturing. As a development partner, PolyAn facilitates efficiencies and innovation to maximize your capacities in research and analysis rather than in development and manufacturing. Let us know what you and your company are exploring and we can support you in making that a reality.

\* Image courtesy Cellenion S.A.





## Transparent PMMA Beads

PolyAn offers transparent polymer beads with a narrow particle size distribution (CV less than 5%) for particle analysis using flow cytometry or other screening applications.

Product-ID	Diameter	Description
105 00 002	2 $\mu\text{m}$	Transparent PMMA Beads
105 00 005	5 $\mu\text{m}$	Transparent PMMA Beads
105 00 009	9 $\mu\text{m}$	Transparent PMMA Beads
105 00 012	12 $\mu\text{m}$	Transparent PMMA Beads
105 00 016	16 $\mu\text{m}$	Transparent PMMA Beads
105 00 020	20 $\mu\text{m}$	Transparent PMMA Beads

## Functionalized transparent PMMA Beads

Product-ID	Diameter	Surface
105 11 002	2 $\mu\text{m}$	3D-Carboxy
105 11 005	5 $\mu\text{m}$	3D-Carboxy
105 11 009	9 $\mu\text{m}$	3D-Carboxy
105 11 012	12 $\mu\text{m}$	3D-Carboxy
105 11 016	16 $\mu\text{m}$	3D-Carboxy
105 11 020	20 $\mu\text{m}$	3D-Carboxy
105 21 002	2 $\mu\text{m}$	Streptavidin
105 21 005	5 $\mu\text{m}$	Streptavidin
105 21 009	9 $\mu\text{m}$	Streptavidin
105 21 012	12 $\mu\text{m}$	Streptavidin
105 21 016	16 $\mu\text{m}$	Streptavidin
105 21 020	20 $\mu\text{m}$	Streptavidin
108 35 002	2 $\mu\text{m}$	3D-Azide
108 35 005	5 $\mu\text{m}$	3D-Azide
108 35 009	9 $\mu\text{m}$	3D-Azide
108 35 012	12 $\mu\text{m}$	3D-Azide
108 35 016	16 $\mu\text{m}$	3D-Azide
108 35 020	20 $\mu\text{m}$	3D-Azide

In addition to the products listed above, PolyAn also offers transparent beads that are functionalized with 3D-Aldehyde, Neutravidin, 3D-Alkyne, Poly-L-Lysine and Protein A/G, PolyAn also offers the custom modification of beads with oligonucleotides and peptides, respectively.

Please have a look at our website [www.poly-an.de](http://www.poly-an.de) for a complete overview of our portfolio.

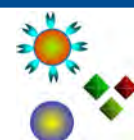


### Fluorescence encoded PMMA Beads

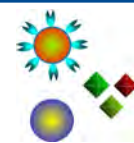
PolyAn's fluorescent microparticles are available in various sizes, emission spectra and fluorescence intensities. The fluorescent PMMA microparticles are suitable for use in flow cytometry, fluorescence microscopy, phagocytosis studies and cell labeling. They can be used in image based systems as well as in other screening applications.

Product-ID	Diameter	Colour Labeling	Excitation/Emission
105 89 002	2 µm	PolyAn Blue	350–400 nm/400–480 nm
105 89 005	5 µm	PolyAn Blue	350–400 nm/400–480 nm
105 89 009	9 µm	PolyAn Blue	350–400 nm/400–480 nm
105 89 012	12 µm	PolyAn Blue	350–400 nm/400–480 nm
105 60 002	2 µm	PolyAn Green	415–480 nm/470–550 nm
105 60 005	5 µm	PolyAn Green	415–480 nm/470–550 nm
105 60 009	9 µm	PolyAn Green	415–480 nm/470–550 nm
105 60 012	12 µm	PolyAn Green	415–480 nm/470–550 nm
106 70 002	2 µm	PolyAn Pink	450–565 nm/540–620 nm
106 70 005	5 µm	PolyAn Pink	450–565 nm/540–620 nm
106 70 009	9 µm	PolyAn Pink	450–565 nm/540–620 nm
106 70 012	12 µm	PolyAn Pink	450–565 nm/540–620 nm
105 40 002	2 µm	PolyAn Red	510–580 nm/570–630 nm
105 40 005	5 µm	PolyAn Red	510–580 nm/570–630 nm
105 40 009	9 µm	PolyAn Red	510–580 nm/570–630 nm
105 40 012	12 µm	PolyAn Red	510–580 nm/570–630 nm
106 00 002	2 µm	PolyAn Red4	590–680 nm/660–780 nm
106 00 005	5 µm	PolyAn Red4	590–680 nm/660–780 nm
106 00 009	9 µm	PolyAn Red4	590–680 nm/660–780 nm
106 00 012	12 µm	PolyAn Red4	590–680 nm/660–780 nm
106 10 002	2 µm	PolyAn Red5	490–680 nm/660–730 nm
106 10 005	5 µm	PolyAn Red5	490–680 nm/660–730 nm
106 10 009	9 µm	PolyAn Red5	490–680 nm/660–730 nm
106 10 012	12 µm	PolyAn Red5	490–680 nm/660–730 nm

Please note, that all microparticles can be produced in sizes between 2–20 µm. It is possible to tailor the fluorescence intensity to your specific requirements. PolyAn also produces customized microparticles which incorporate fluorophores for other spectral ranges.







## Functionalized fluorescence encoded Beads

PolyAn offers a wide variety of functionalized, fluorescent particles. They can be used in flow cytometry, image based systems as well as in other applications. The fluorescence intensity of the beads can be tailored to specific applications and read-out systems. We are happy to help you select the right fluorescence intensity for your application.

Product-ID	Diameter	Surface	Colour Labeling	Excitation/Emission
105 91 002	2 $\mu\text{m}$	3D-Carboxy	PolyAn Blue	350–400 nm/400–480 nm
105 91 005	5 $\mu\text{m}$	3D-Carboxy	PolyAn Blue	350–400 nm/400–480 nm
105 91 009	9 $\mu\text{m}$	3D-Carboxy	PolyAn Blue	350–400 nm/400–480 nm
105 91 012	12 $\mu\text{m}$	3D-Carboxy	PolyAn Blue	350–400 nm/400–480 nm
105 60 002	2 $\mu\text{m}$	3D-Carboxy	PolyAn Green	415–480 nm/470–550 nm
105 60 005	5 $\mu\text{m}$	3D-Carboxy	PolyAn Green	415–480 nm/470–550 nm
105 60 009	9 $\mu\text{m}$	3D-Carboxy	PolyAn Green	415–480 nm/470–550 nm
105 60 012	12 $\mu\text{m}$	3D-Carboxy	PolyAn Green	415–480 nm/470–550 nm
106 72 002	2 $\mu\text{m}$	3D-Carboxy	PolyAn Pink	450–565 nm/540–620 nm
106 72 005	5 $\mu\text{m}$	3D-Carboxy	PolyAn Pink	450–565 nm/540–620 nm
106 72 009	9 $\mu\text{m}$	3D-Carboxy	PolyAn Pink	450–565 nm/540–620 nm
106 72 012	12 $\mu\text{m}$	3D-Carboxy	PolyAn Pink	450–565 nm/540–620 nm
105 45 002	2 $\mu\text{m}$	3D-Carboxy	PolyAn Red	510–580 nm/570–630 nm
105 45 005	5 $\mu\text{m}$	3D-Carboxy	PolyAn Red	510–580 nm/570–630 nm
105 45 009	9 $\mu\text{m}$	3D-Carboxy	PolyAn Red	510–580 nm/570–630 nm
105 45 012	12 $\mu\text{m}$	3D-Carboxy	PolyAn Red	510–580 nm/570–630 nm
106 02 002	2 $\mu\text{m}$	3D-Carboxy	PolyAn Red4	590–680 nm/660–780 nm
106 02 005	5 $\mu\text{m}$	3D-Carboxy	PolyAn Red4	590–680 nm/660–780 nm
106 02 009	9 $\mu\text{m}$	3D-Carboxy	PolyAn Red4	590–680 nm/660–780 nm
106 02 012	12 $\mu\text{m}$	3D-Carboxy	PolyAn Red4	590–680 nm/660–780 nm
106 11 002	2 $\mu\text{m}$	3D-Carboxy	PolyAn Red5	490–680 nm/660–730 nm
106 11 005	5 $\mu\text{m}$	3D-Carboxy	PolyAn Red5	490–680 nm/660–730 nm
106 11 009	9 $\mu\text{m}$	3D-Carboxy	PolyAn Red5	490–680 nm/660–730 nm
106 11 012	12 $\mu\text{m}$	3D-Carboxy	PolyAn Red5	490–680 nm/660–730 nm

Please note, that all microparticles can be produced in sizes between 2–20  $\mu\text{m}$ . PolyAn also produces customized microparticles which incorporate fluorophores for other spectral ranges.

Our fluorescence encoded beads are also available with 3D-Aldehyde, Streptavidin, Neutravidin, Poly-L-Lysine, Protein A/G, 3D-Azide and 3D-Alkyne surfaces. A custom modification with peptides or oligonucleotides is available upon request.

## Quality Management

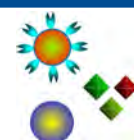
PolyAn pursues a policy of continued technical excellence to deliver high quality products and services. Our company is dedicated to product consistency and reliability – providing our customers with highly reproducible consumables for their specific applications.

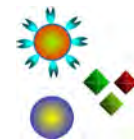
To ensure this PolyAn has successfully implemented the DIN EN ISO 9001 quality management system for all processes. PolyAn's production facilities also include a class 5 cleanroom.

## How to place an order

We are looking forward to your telephone orders and technical enquiries at our Customer Service and Technical Service Department Monday-Friday. Office hours for telephone enquiries are 9:00 AM to 6:00 PM (Central European Time). Please mention billing and shipping addresses, product-ID, quantity, your phone number or Email and name.

<b>Contact</b>	Tel +49 (0)30 912 07 80 Fax +49 (0)30 912 07 811 Email mail@poly-an.de
<b>Terms &amp; conditions</b>	PolyAn's general terms & conditions apply.
<b>Ordering process</b>	After placing your order you should receive an order acknowledgement via Email within 3 business days. When your beads have been shipped, we will notify you via Email to provide you with the shipping information, e.g. tracking number.
<b>Minimum quantity</b>	The beads are packaged in aqueous suspensions with a volume of 1.5 mL, 4 mL and 10 mL, respectively. These are the minimum quantities. Please note, that discounts are available for large order volumes.
<b>Payment terms</b>	The full price is payable within 14 days after the date of the invoice.
<b>Shipping and handling</b>	All prices are Ex-Works PolyAn, Berlin. The beads will be shipped via FedEx, UPS, TNT, DHL or airmail





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# PolyAn

molecular  
surface  
engineering

