

# Nanomagnetic reagents & kits

# Nanomagnets.

## Time is an issue - it always is

TurboBeads is the next generation of magnetic beads. Our particles are metal nanoparticles carrying a covalently linked surface functionality. With this we follow a totally new design principle for magnetic beads - instead of making our particles out of ferrites and polymers we use pure metals and elemental carbon. These two materials are combined in a core/shell set-up giving excellent magnetic properties (from the metal core) in combination with an unmatched chemical and biological stability of the carbon shell.

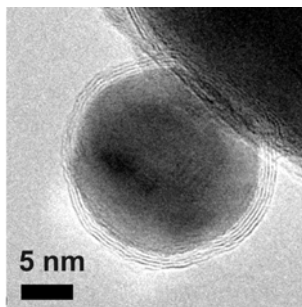


Fig 1: A single TurboBead as seen in an electron microscope. The metal nanoparticle is encased by 2-3 graphene-like carbon layers.

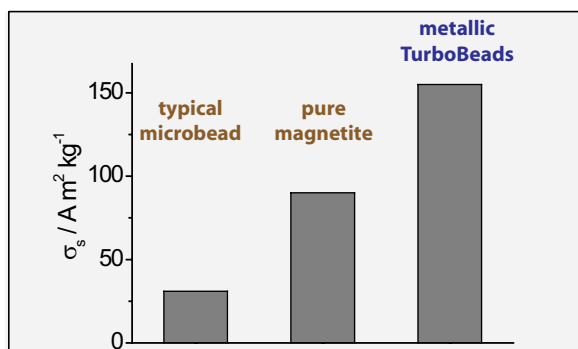


Fig 2: The saturation magnetization  $\sigma_s$  of TurboBeads is far superior to classical oxide based materials and reflects the metallic nature of the nanobead's core.

### Off the shelf TurboBeads

product	cat no.
●—NH <sub>2</sub>	1001
●—COOH	1008
●—Protein A	1009
●—NH <sub>2</sub> / DMF	1012
TurboBeads Coupling Kit	1014

#### Key properties:

- average particle size: 30 nm
- magnetic saturation: 155 emu / g
- functional loading:  $\geq 0.1$  mmol / g , that is 100'000 nanomol / g
- metal content: > 90 wt%
- autoclavable up to 140 °C
- compatible with all solvents
- stable at wide range of pH
- large surface area (> 20 m<sup>2</sup> / g)

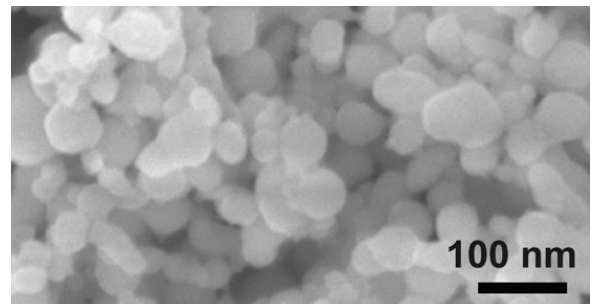
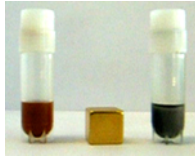
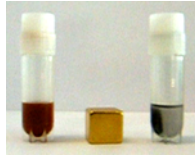


Fig 3: TurboBeads narrow particle size distribution shown under the scanning electron microscope.

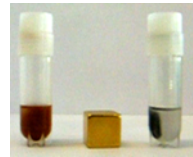
Micro (left) vs. TurboBeads (right).



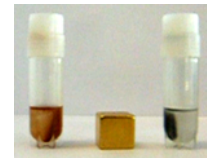
0.5 s



2 s



20 s



40 s

## Stable, covalent binding

Since binding to TurboBeads relies on carbon-carbon bonds, no ligands are lost, even under demanding process conditions. Our  $-COOH$  and  $-NH_2$  TurboBeads are compatible with most peptide coupling protocols enabling the immobilization of amino acids, oligos, peptides, antibodies, viruses.

### Apply TurboBeads for:

- Nucleic acid synthesis
- Magnetic immunoassays
- Magnetic immunoprecipitation
- Protein/peptide amplification
- Heavy metal extraction
- Reliable antibody binding (protein A)

or follow your own ideas and take advantage of TurboBeads exceptional properties.

## TurboBeads Coupling Kit

We supply a specialized magnetic nanobeads coupling kit for the immobilization of antibodies, oligos and peptides. The coupling kit contains all buffers and reagents required for the peptide coupling.

## Custom made TurboBeads

Upon request we prepare TurboBeads with a customer specified surface functionality. Contact us for the wide range of available possibilities.

## TurboBeads are stronger and faster

Because TurboBeads are metallic, they have largely increased magnetic properties. They can be separated from micro-liter to multi-liter volumes using standard off-the-shelf magnets within seconds to minutes. When using TurboBeads there is no need for specialized magnets or high-magnetic-gradient-separators (HGMS). Our products are supplied with a suitable gold-plated magnet.

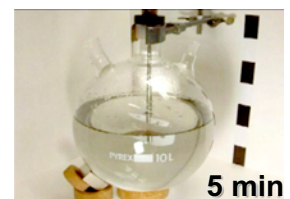


Fig 4: A stirred 10 liter reaction vessel with 1 g of suspended TurboBeads (left). The 30 nm metal nanobeads can be separated from the liquid with a commercial low-cost magnet (right; left side of the vessel) within just 5 minutes.

Smaller is faster.

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