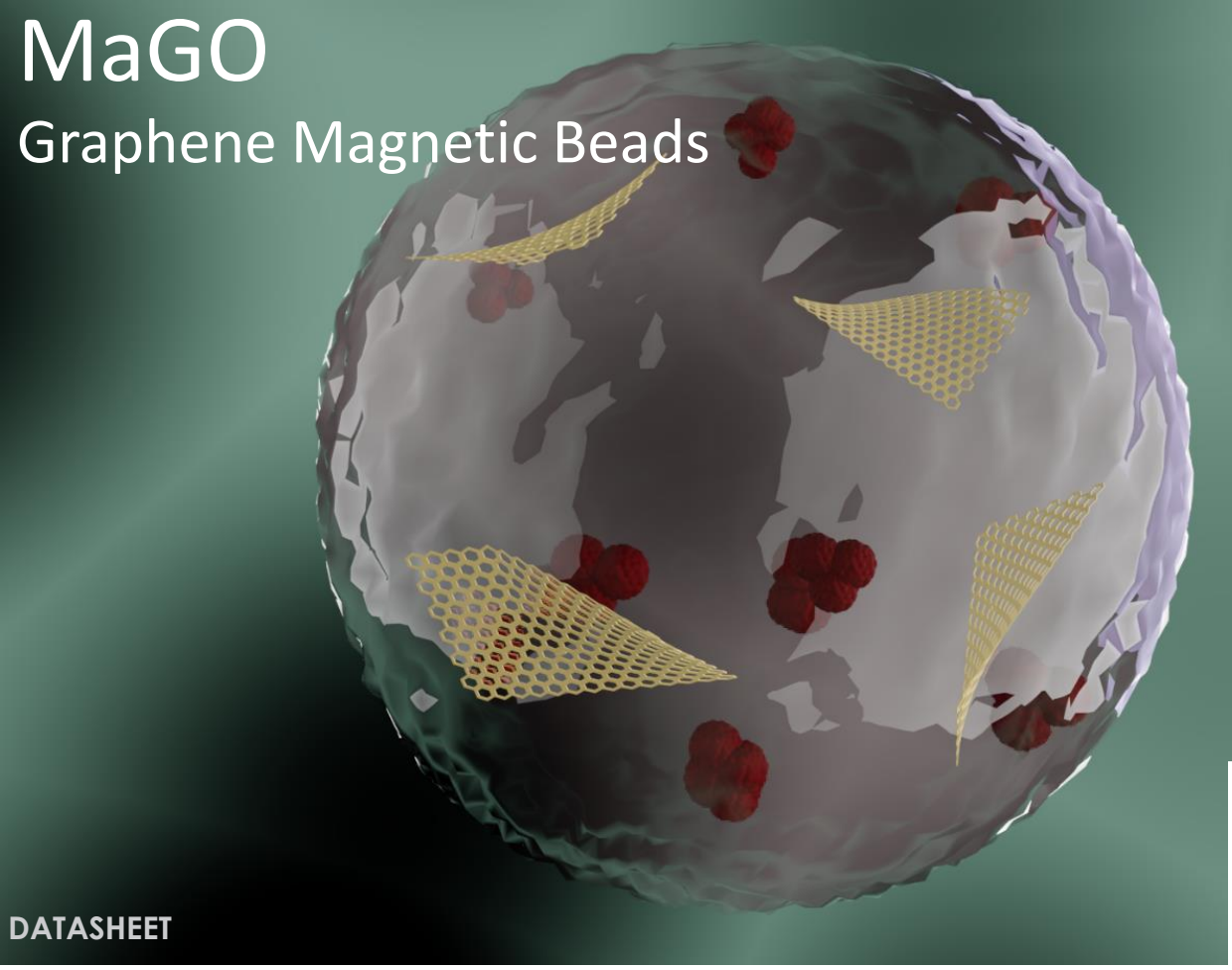
# MaGO

## Graphene Magnetic Beads



DATASHEET

IMMAGINA BioTECHNOLOGY
The Ribosome Company

## Introduction

IMMAGINA BIOTECHNOLOGY present MaGO, graphene magnetic beads.

The MaGO are composed of agarose magnetic beads containing Graphene Oxide or reduced Graphene Oxide. Superparamagnetic core allows a fast magnetic separation of the beads by application of an external magnetic field. The homogeneous dispersion of Graphene inside the porous matrix allow the stabilization of the graphene sheet eliminating the possibility of flocculation or precipitation.

## Highlights

**Fast separation**

- Magnetic separation in seconds

**Homogeneous graphene dispersion**

- High stability in different medium including high salt or low/high pH

**High adsorption capacity**

- Adsorption of positively charged dyes in few seconds

**DNA/RNA adsorption**

- Fast adsorbtion on nucleic acid

## Introduction

Graphene-based materials have been recently reported to have potential applications in different fields. On the other hands, Graphene oxide and reduced graphene oxide in colloidal form tend to precipitate in high salt buffer or in low/high pH condition. Unfortunately, this type of interaction significantly reduces the total available reactive surface for analyte binding. A solution to these problems involves the incorporation of graphene sheets into porous polymeric matrix, with the advantage of avoiding the precipitation with consequent formation of compact graphene multilayers, thereby increasing the total available surface area. The incorporation of the Graphene Oxide into the agarose structure enables the stabilization of the sheets. As consequence, the MaGO beads can be used with strong buffer solution including high salt or low/high pH. The magnetic nature of this beads allow a fast separation with the possibility to capture and purify the analyte of interest in few minutes. Given its simplicity, effectiveness and universality, these materials and methods of synthesis should be of great interest in several applications that require specialized graphene composite materials.

## MaGO beads technology

Immagina MaGO beads have a magnetic core embedded in an agarose structure. MaGO are spherical beads with dimensions of about 30-70 µm.(Figure 1). MaGO are available in two different formats: Graphene Oxide and reduced Graphene Oxide.
MaGO beads are superparamagnetic with a tipycal separation times of about 5 seconds

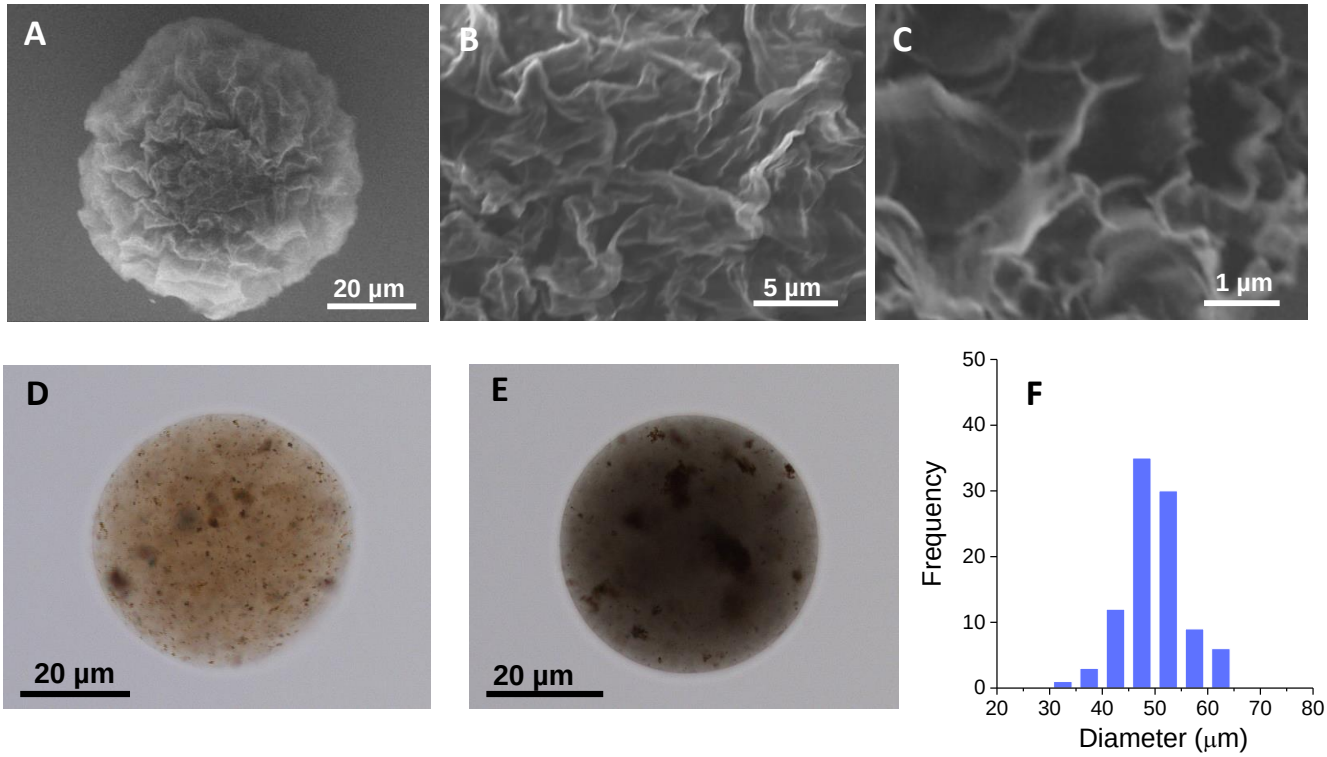



**Fig. 1.** a,) Scanning Electron Microscopy images of a MaGO particle b-c) high magnification images of a MaGO beads showing the porous structure. d) photograph of a beads containing Graphene oxide and e) reduced graphene oxide. f) size distribution of the MaGO particles.

## MaGO can be used in free dye/protein purification

MaGO beads can find application in separation of free dye labels from target protein as reported in Fig. 2. The selective removal of ATTO647N molecules from a mixture of BSA 488 and the dye was obtained by incubation of the solution with MaGO beads and vortexing of 15 seconds, followed by magnetic separation of the beads. As revealed from the Uv-Vis absorption spectra the MaGO beads can efficiently remove unbound dye molecules and can find application in the purification of dye-labelled protein or biomolecules.

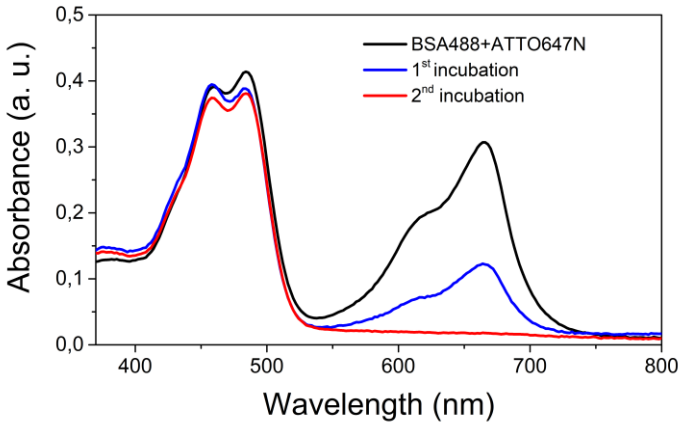



**Fig. 2.** UV Vis of Fluorescein-labelled BSA and free ATTO647N mix (black lines) incubated with MaGO beads followed by vortexing for 5 seconds for one (blue line) or two times (red line).

## MaGO can readily adsorb nucleic acid molecules

Graphene Oxide can bind nucleic acids in the presence of Magnesium cations. Magnesium quickly adsorbs on GO surface forming a positively charged layer that can bind the backbone phosphate of the nucleic acids. The adsorbed oligo can be released simply incubating the beads in EDTA solution. (Fig.3)

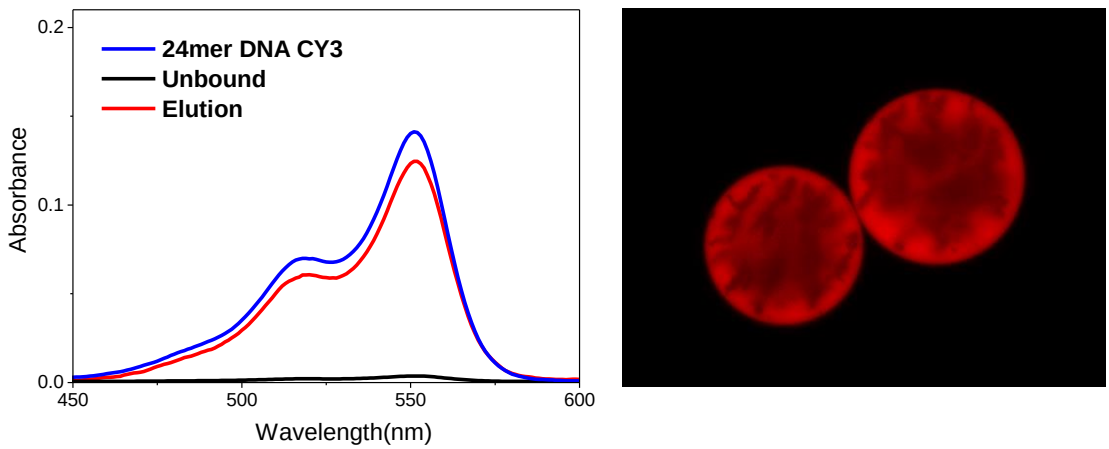



**Fig. 3.** Left: UV Vis of 24 mer DNA CY3 oligo (black line).The fluorescent oligo was incubated with MaGO beads in vortex for 10 seconds. After separation of the beads the supernatant was analyzed (black line). The beads were incubated in 5mm EDTA solution for 5 minutes then after separation of the beads the supernatant was analyzed (red line).Right: Microscope Fluorescence image of MaGOLD 2.5 beads functionalized with Fluorescent oligo.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*For Research Use Only. Not for use in diagnostic procedures.*
*product available only upon request

| Product | Catalog no | amount |
|---|---|---|
| MaGO | MaGO#001 | 5ml |

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