

MATERIALS SCIENCE FOR BIOTECHNOLOGY

Innovative Magnetic Core-Shell Beads for RNA extraction



KEY ACHIEVEMENTS

- **Production** running at **large scale** and **beads available on demand** for testing or purchase
- **Beads extraction efficiency** already **proven** at large scale (> **10 million extraction doses**) at the national and international levels during the Covid-19 crisis in detection kits for Sars-Cov 2 and RNA extraction
- **Patented technology**

KEY COMPETITIVE ADVANTAGES

BEADS

- **High competitive price**
- **High yield of RNA extraction** by comparison to benchmark commercial beads
- **Available as a powder** ready to be dispersed in various media
- **Easy to handle and to store** (long shelf life)
- Very **narrow size distribution** ($1\ \mu\text{m} < \text{size} < 5\ \mu\text{m}$)
- **Composition customizable and tailored to your needs**

PROCESS

- **Innovative technology** for assuming internal production **in your company**
- **Rapid, robust, versatile, easy and continuous process** to produce beads as a powder suitable for DNA and RNA extraction
- **High flexible and reproducible process** with **high throughput** (morphology and composition of the core-shell beads)
- **Easily scalable process**
- **Low CAPEX and OPEX (with reduced cost production)**

CONTEXT & INNOVATION

Due to their low toxicity and supermagnetic properties, **Fe₃O₄ particles** are good candidates in biotechnology for extracting RNA from viruses. To ensure interaction between the magnetic particle and the genetic material, Fe₃O₄ particles need to be functionalized with specific coatings (e.g. silica), that can notably be carried out by wet processing routes.

To date, however, this wet process suffers from several disadvantages : use of solvent, long reaction time, coating quality dependent on several parameters and intensive washing of core-shell particles required after synthesis. Finally, after the drying step, purified core-shell particles must be dried by lyophilization to avoid their oxidation. Therefore, the wet process is a long process with multiple steps and parameters that are hard to control.

GREENMat lab from the University of Liège (Belgium) has developed a new and original patented method to prepare core-shell particles such as Fe₃O₄@SiO₂ particles (or other ceramic powders). The process is a fast, easy and reproducible method to produce magnetic Fe₃O₄@SiO₂ particles used as a powder for DNA and RNA extraction.

PARTNERSHIP SOUGHT

- **New commercial partnership** for using the innovative GREENMat magnetic beads
- Partnership for **producing, selling/or using** the core-shell beads **via a licensing agreement** for internal or external uses (RNA/DNA extraction for testing or vaccines)

UPCOMING CHALLENGES

- Developing **new coatings** onto the beads to favor specific extraction
- Strategy for adapting the synthesis parameters to **your application**

INTELLECTUAL PROPERTY

- Patent application US 63/001,680 pending, filed on March 30, 2020



CONTACT

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