

**TECH OFFER**

## Eco-Friendly Microcapsule Solutions for Industrial Adhesives



### KEY INFORMATION

TECHNOLOGY CATEGORY:

Chemicals - Inorganic

Chemicals - Organic

Materials - Composites

Manufacturing - Chemical Processes

TECHNOLOGY READINESS LEVEL (TRL): **TRL9**

COUNTRY: **HONG KONG**

ID NUMBER: **TO175270**

### OVERVIEW

The use of traditional industrial adhesives faces persistent challenges, including VOC emissions, material waste, process bottlenecks, high energy consumption, and slow product iteration. These issues are leading to heightened regulatory scrutiny from environmental agencies and increasing demands for energy conservation and emission reduction. Furthermore, traditional adhesives manufacturers do not meet the automotive and electronics industries' need for rapid product iterations. This microcapsule-based encapsulation technology ( $\mu$ Caps) addresses these challenges by enabling intelligent encapsulation and precise controlled release of adhesive components while minimizing environmental impact.

Built on pioneering "Accurate Architecting Technology at the Micro- and Nano Interface" and a high-throughput  $\mu$ Caps screening and synthesis platform, this technology facilitates controlled, on-demand release and customizable core material functions in adhesives. It provides significant customization and operational flexibility while producing adhesives with lower VOC content,

resulting in improved eco-friendliness, enhanced adhesion, and energy-saving properties. With precise control over the micro- and nanostructures of adhesive components, this technology is ideal for high-value applications in the automotive, electronics, and aerospace sectors.

The technology owner positions itself as an innovative solution provider in the industrial adhesives sector, offering a range of  $\mu$ Caps to customers. They are seeking collaborations through joint R&D projects with adhesive manufacturers and companies in industries such as automotive, electronics, and aerospace. The focus is on those looking to penetrate the high-value-added industrial adhesives market, co-developing innovative products and applications that fully leverage this technology's potential.

## TECHNOLOGY FEATURES & SPECIFICATIONS

Based on the pioneering "Precision Architecture Technology for Micron and Nano Interfaces" and the high-throughput  $\mu$ Caps screening and synthesis platform, a fully proprietary and powerful platform technology has been constructed for specialty chemicals that can replace imported products and expand new application scenarios.

Some features of  $\mu$ Caps include:

- Wide Range of Particle Sizes: From nanometers to millimeters
- Diverse Shell Materials: Organic, inorganic, metal/alloy, graphene, and composites
- Precise Control of Micro-Nano Structures: Including thickness, number of layers, surface roughness, density, and core materials
- Rapid and Agile Iteration Capability: Scaling from 1 formulation per day to 10n10<sup>n</sup>10n formulations per day
- Superior  $\mu$ Caps Performance: Highly water- and solvent-resistant, high-temperature-resistant, and optimized for maximum strength and dynamic energy absorption
- Customizable: Allows for controlled release of components on demand
- Low VOC Content

## POTENTIAL APPLICATIONS

Potential applications of the  $\mu$ Caps technology include (but not limited to):

- Adhesives: Including structural, anaerobic sealants, and conductive/nonconductive adhesives
- Building materials: For thermal management and anti-fouling
- Cosmetics and food: As essence/perfume/cream/food additives carriers and anti-staling agents carriers or anti-staling agents
- Agriculture: For controlled release pesticides and fertilizers
- Biomedicine: Targeted drug delivery and enzyme encapsulation
- Other applications: Self-healing materials and personalized care products

## UNIQUE VALUE PROPOSITION

This technology stands out due to its high performance-to-price ratio, eco-friendly design (low VOC and waterborne), and

energy-saving capabilities. It is customisable and adhesives produced offer superior performance, particularly in high-value industrial applications.