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SEKISUI KASEI CO., LTD. (Head Office: 2-4-4 Nishi-tenma, Kita-ku, Osaka, Japan; President: Masato Kashiwabara), working together with a research team including Prof. Dr. Hideto Minami in Department of Chemical Science and Engineering at Kobe University, has discovered the world's first ever method for mass producing hollow microparticles with polyimide shells and has developed "TECHPOLYMER Polyimide Hollow Microparticle" commercial production technology.

## SEKISUI KASEI Develops TECHPOLYMER™ Polyimide Hollow Microparticles, the World's First Mass-Producible Polyimide Hollow Microparticles

Joint Research Conducted with a Team Including Prof. Dr. Hideto Minami in  
Department of Chemical Science and Engineering at Kobe University

### 1. Background

Polyimide is highly heat resistant and offers exceptional mechanical strength, chemical stability, and insulation performance. It is applied in a wide range of fields such as electrical and electronic materials and aerospace materials. Polyimide hollow microparticles with an air layer inside, so they are good insulation, lightweight, have low density, and have low refractive indexes. For 5G (5th Generation Mobile Communication System), whose strengths are high capacities, low delay, and multipoint connectivity, there are high hopes for polyimide hollow microparticles as heat resistant, low dielectric material that can be used in high speed transmission channels to help prevent transmission loss. However, due to the fact that polyimide is highly heat resistant, it is difficult to process into fine particles, and there have been almost no reports of successfully creating hollow polyimide particles in the past.

### 2. Details

TECHPOLYMER is a polymer microparticle made using proprietary polymerization technology and is used in a variety of applications such as LCD display diffusion material, an additive in cosmetics, and to produce a matte finish in paints.

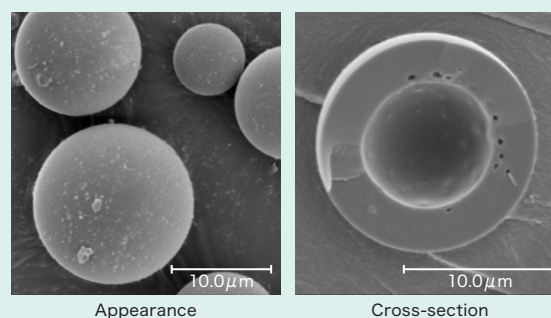
SEKISUI KASEI is already selling TECHPOLYMER NH\*<sup>1</sup>, acrylic-based hollow microparticles, but through joint research with a team including Prof. Dr. Hideto Minami in Department of Chemical Science and Engineering at Kobe University, it has recently discovered, for the first time ever\*<sup>2</sup>, a technique for mass producing hollow microparticles with polyimide shells, and has developed polyimide hollow microparticles with exceptional insulation performance and heat resistance.

#### Features

- Spherical microparticles made of polyimide and have hollow structures.
- Highly heat resistant and chemical stability, and have superb mechanical properties.
- Lightweight and excellent insulation from interior hollow structure.

Particle	5% mass reduction temperature
Polyimide hollow microparticles	422°C
Cross-linked PMMA microparticles	270°C

Electron microscope photograph of  
Polyimide Hollow Microparticle



### 3. Future Development

SEKISUI KASEI is switching to businesses that solve environmental and social issues. We will continue to proactively engage in unprecedented open innovation and rapidly put research and development findings to practical use to create new value that illuminates a brighter future for the global environment and society.

\*1 Nanosized polymer particles with a hollow interior.

\*2 This has been presented at the 72nd International Polymer Colloids Group Conference, held from June 18 to 23, 2023.

This news release has been distributed to the Chemical Industry Press Club and 21 industry papers.  
Similar materials have been distributed by Kobe University to the Hyogo Prefecture Board of Education Press Club, the Kobe Commercial Broadcasting Press Club, and the Osaka Science and University Press Club.