### Bubble Dynamics Group

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**Main Subjects**  
1. Dynamics of Microbubbles  
2. Application of Microbubbles  
3. Fabrication of Hollow Microcapsules

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**Content**

Microbubble is defined as the gas bubble whose diameter is under 50 micrometers. Microbubble has various characteristics, for example, large surface per volume unit and long reaction time in the liquid. These characteristics are effective for chemical or bionic reaction process.

We found that Micro bubbles of uniform diameter from 4 to 15 \( \mu \text{m} \) were generated at a constant periodic rate when a small amount of gas was introduced (via a needle) into a highly viscous liquid. Our group tries to clarify the break-up mechanism of micro-bubbles and apply this method to practical use.

Hollow microcapsules are gas-filled spherical particles with diameters between 1 and 1000 micrometers. They show promising potential due to their advantageous properties, such as low effective density and high specific surface. We are also studying about the fabrication process of hollow melamine-formaldehyde microcapsules from microbubble templates.

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![Fig. 1 Microbubbles generated from a needle](image1)

![Fig. 2 SEM image of Hollow Microcapsules](image2)