



**VISUALIZATION OF STARVED FLOW IN AN INTERMESHING REGION OF A TWIN-SCREW EXTRUDER**

Kazuya Maeda<sup>1</sup>, Takeshi Ishikawa<sup>2</sup>, Tatsuya Tanaka<sup>1</sup>, Yutaka Imaida<sup>1</sup>  
<sup>1</sup>Doshisha University, <sup>2</sup>Mitsubishi Chemical Corporation

*dtk0329@mail4.doshisha.ac.jp*

Twin-screw extruders have been widely used in the polymer industry. They are high performance devices for the mixing of materials. Fundamental functions of twin-screw extruders are mixing, modifying and polymerization of two or more different materials in order to manufacture new materials. The flow patterns in the devices are complicated. Therefore, it is very important to know the flow behavior of materials inside the extruder in order to design a mixing channel. As the computer technology was progressed, flow patterns in a fully filled region became obvious. However, the detailed flow behavior is not understood in the case of starved flow. In this study, the visualization experiments were performed in the twin-screw extruder, focusing on the starved flow in the intermeshing region. In addition, the influence of the fill degree on residence time was researched. The experiments were carried out in the intermeshing co-rotating twin-screw extruder (ZSK18, Coperion), using a transparent acrylic barrel. High viscous silicone oil was used as the model fluid. The flow patterns were captured by the high speed camera and the residence time were investigated by the tracer tracking analysis.