

# MERIT Corporate Internship Report (2015.09.01 – 2015.10.31)

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## Introduction

I participated in the internship of Advanced Softmaterials Inc. from September 1 to October 31, 2015. The company is located in Kashiwa-shi, Chiba. ASM aim to further develop Slide-Ring Material which is first developed in Tokyo University. Before now, damage resistant coating main agent, polishing system, dielectric actuator and vibration device using Slide-Ring Material elastomer have been developed. Now, they are aiming to apply for adhesive agent, optical material, and vibration control

## Activities of Internship

First, I evaluated the experiment to estimate hydroxyl value of “SeRM Super Polymer SH series” which is one of products in ASM. Hydroxyl value shows how many reactive hydroxyl groups are included in the material. Until now, some customers have indicated actual hydroxyl value is different from catalog value. One reason for this difference is supposed to be reaction time of measurement for hydroxyl value determination. I evaluated the effect of reaction time. I got that reaction time effect is very small.

Next, I synthesized photo cross-linkable polyrotaxane called “SeRM Super Polymer SA Series” in ASM. This material expected to give scratch resistance, flexibility, reduction of shrinkage and curing, et al. We aimed to improve modification ratio of photo cross-linkable polyrotaxane by changing reaction step. And I synthesized more modification ratio test sample for new product development.

Then, I modified nonreactive group to hydroxyl groups of “SeRM Super Polymer”. This reaction is aimed to decrease hydroxyl group in the material because it is undesirable for some customers that many hydroxyl group remain after treatment. For the first step, reaction condition was decided by the dozens of grams experiment at laboratory. Next step, kg scale material was synthesized by using large equipment (Figure 1,2). Heater temperature, reaction mixture temperature and stirring voltage were monitored during reaction. If some trouble occurred, we

can easily confirm that what step rapid reaction occurred, when polymerization began and so on.

Finally, I synthesized solventfree one-component thermosetting resins by large equipment. This material named “SeRM Elastomer SH Series” give elastomer just by heating. In this synthesis we aimed to prepare harder products than usual them. In the first step, we synthesized oligomer to change properties. Next step, we add usual SeRM Elastomer SH Series et cetera and obtained elastomer.

This internship is good experience for not only my research but also my future career plan because it is difficult in only laboratory to realize large scale synthesis and following important viewpoint from a company. In addition, I participated in lecture meeting two times. And, I learned about patents for example how company treat it, what problem occur with it and so on.

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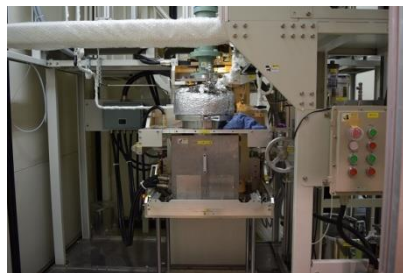


Figure 1. Large equipment



Figure 2. Products