Training on real-time preparation of elastomer composite

Polymer Chemistry is rapidly emerging as a key component of contemporary science**.** Polymers have evolved from being inexpensive substitutes for natural products to providing high-quality options for a wide variety of applications. Polymers are widely used in multiple areas such as film packaging, rigid compression molds for car body parts and television cabinets, composites for golf clubs and aircraft parts (climbing and interior), foams for coffee cups and refrigerator insulation, fibers for clothing and carpets, adhesives for attaching anything to anything, rubber for tires and hoses, paints, and other coatings to beautify and extend the life of other materials, and countless other uses. To enhance the knowledge about polymer processing, instrumentation involved elastomer composite, a training on real-time preparation of elastomer composite held at "Polymer Processing and Rubber Technology Lab" for the students of chemistry department who were enrolled in the course entitled "Synthesis and Reaction Mechanism of Polymer (CHM-672)" in the CUI Lahore campus.

Amis and objectives

The main aim of training on preparation of elastomer composite was to acquire hands-on experience in elastomer formation using different instruments *i.e.*, Thermo Scientific™ THAAKE Rheomix OS Lab Mixer, Mon-Tech MDR (Moving Die Rheometer) 3000, and build a strong knowledge of polymer processing unit operations, extrusion, and injection molding. The purpose of this activity is to enable the student to understand indigenous R& D activity involved in polymer preparation.

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COMSATS University Islamabad, Lahore campus, Chemistry department had organized a hands-on training entitled, "real-time preparation of elastomer" composite, for the MS chemistry (2^{nd} semester) students by Prof. Dr. Zulfiqar Ali and Dr. Sadaf ul Hassan. The activity started at 11 a.m. in the "Polymer Processing and Rubber Technology Lab". Prof. Dr. Zulfiqar Ali and dr. Sadaf ul Hassan gave a detailed overview of the theoretical background of polymer processing, elastomer composite mechanism, and instrument involved for the elastomer composite preparation *i.e.*, Thermo scientific THAAKE Rheomix OS lab mixer, hydraulic press (auto four/3012-PLH), moving to die rheometer and mini-injection molding (NISSE HM7). Elastomer composite preparation started by using cellulose as filler and NBR as a matrix and other additives were added into the internal mixer (Thermo Scientific™ THAAKE Rheomix OS Lab Mixer). After the mixing process, the mixture was transferred into a hydraulic lab presser, and then a uniform round compressed pallet was transferred to a moving die rheometer (Mon-Tech MDR (Moving Die Rheometer)). The moving die rheometer showed the viscoelastic properties of the rubber compound as well as the physical properties of the composite. The hands-on training on real-time preparation of elastomer composite is intended to help the student to understand the basic polymer formation process.

Photo Gallery

Elastomer preparation on Thermo Scientific™ THAAKE Rheomix OS.

Overview of theoretical background of polymer processing.

Students learned about Mini injection Molding **(**NISSIE HM7)

Briefings on Die Rheometer press by Dr. Sadaf Ul Hassan.

Briefings on hydraulic laboratory press by Prof. Dr. Zulfiqar Ali.

Steps involved in elastomer composite formation.

Group Photo