

# **E** Effective Mechanisms on Curing and Properties of Chlorosulfonated Polyethylene Rubber (CSM) and its Blends

H. Roshanaei<sup>1</sup>, M. Poorhossaini<sup>2</sup>, M. Razavizadeh<sup>3</sup>, M. Khabiri

1. Faculty of Materials and Manufacturing Technologies, Malek Ashtar University of Technology, Iran
2. Faculty of Materials and Manufacturing Technologies, Malek Ashtar University of Technology, Iran
3. Faculty of Materials and Manufacturing Technologies, Malek Ashtar University of Technology, Iran
4. Faculty of Materials and Manufacturing Technologies, Malek Ashtar University of Technology, Iran

\*Corresponding author Email: [mr\\_pourhossaini@yahoo.com](mailto:mr_pourhossaini@yahoo.com)

## Abstract

**Chlorosulfonated polyethylene (CSM) or the rubber polymer with the brand name Hypalon is one of the types of engineering rubbers with special applications. CSM has no direct synthesis method and is prepared by chemical modification of low density polyethylene. Although its raw material (polyethylene) is a polymer with the nature of plastics, its chemical modification by acids such as sulfuric acid and hydrochloric acid causes a behavioral transformation from a plastic material to a rubber polymer. This acidic modification removes low-density polyethylene crystals and creates cross-linking capability, which exhibits a polymeric material a superior rubber nature beside of the low glass transition temperature of polyethylene. Also, CSM has a great ability and variety in creating cross-links by different chemical or physical curing systems. As this rubber demonstrates wide variety of cross linking ability with many different kinds of cure systems, additives and some other rubbers (self-curing systems). In this article, the mechanism of various reactions causing cross-linking on this rubber with various curing systems, fillers, etc. has been investigated. For this purpose, the physical-mechanical properties of CSM rubber and chemical mechanisms with different curing systems as well as fillers such as carbon black and silica have been investigated.**

**Keywords:** Polyethylene Chlorosulfone Rubber, Rubber Curing, Self-vulcanizing, Chemical Mechanisms