Use of Needleless Electrospinning to Disperse Nanosilica in Silicone Rubber

Tahir A. Jeddy, Chitral J. Angammana and Shesha H. Jayaram
University of Waterloo
e-mail: shesha.jayaram@uwaterloo.ca

***Abstract*— Electrospinning has become a simple and effective way to produce nanofibers. Recently, needleless electrospinning (ES) systems have attracted considerable attention due to their high throughput as compare to needle based ES systems. The process of ES has also been effectively used in dispersing nanofillers in polymers. In this paper, needleless electrospinning is used to disperse nano silica in silicon rubber in order to reduce the agglomeration in nano-composites, to improve the thermal, mechanical and electrical performances of the composites. Silicone rubber nanocomposites with 7 nm silica fillers are produced by using both the needle-less ES process and conventional mechanical mixing. The morphology of nanosilica composites is characterized by means of scanning electron microscopy. The thermal performance is exam-ined by thermo-gravimetric analysis and infrared-laser-based thermal test. In addition, specif-ic performance test are also conducted on the silicone rubber nanocomposites to examine the mechanical and electrical performances.**