POSS as Modifiers and Additives for Elastomer Composites

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Abstract : The studies were focused on POSS application with methylvinylsilicone rubber (MVQ). The obtained results indicate that they can be successfully incorporated into silica-filled rubbers as modifying agents since they enhance cross-link density and improve most properties of the resulting network. It is also worth noting that the incorporation of POSS molecules resulted in stabilizing effect against adverse changes induced by the climatic, ozone or UV ageing of the rubbers. Furthermore, we obtained interesting results of rubbers surface modification using POSS functionalised with halogen groups (Cl, F, and Br). As the results, surface energy of the elastomeric composites and their hydrophobicity increased, barrier properties improved and thermal stability increased as well. Additionally, the studies with silicone rubber and POSS containing acidic and alkaline groups revealed composites with self-healing properties. The observed effects strictly depend on a kind and quantity of functional groups present in angles of POSS cages.

Keywords : elastomeric composites, POSS, properties modyfication, silicone rubber

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