Effects of fumed silica treated with fluorine containing silane on silicone/silica composites properties

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Ion elution from elastomeric gaskets in fuel cell plays an important role in terms of durability and stability of fuel cell. In this study, the mechanical and thermal properties of a silicone composites including fumed silica treated with fluorine containing silane, perfluoroctyltriethoxysilane (FAS), were studied. Energy dispersive x-ray and x-ray photoelectron spectroscopy was employed to confirmed the contents of fluorine atoms before and after surface modification using FAS. The composites were submerged in accelerated aging solution for ion elution test. The inductively coupled plasma optical emission spectroscopy data showed that fluorine atom prevent the gasket degradation and reduce the ion elution. However, we found the slight decrease of hardness and tensile strength of silicone composites. The morphology was observed with optical microscopy and SEM to confirmed compatibility of silicone composites.

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