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# Effect of Nano-silica Filler on Microstructure and Mechanical Properties of Polydimethylsiloxane-based Nanocomposites Prepared by “Inhibition-grafting” Method

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## Abstract:

Silica/polydimethylsiloxane nanocomposites (denoted as SiO<sub>2</sub>/PDMS) prepared by physical mixing exhibit poor processing flexibility and strength associated with the high viscosity effect and low addition amount of silica during the fabrication of room-temperature vulcanized PDMS elastomer. Thus a facile and scalable one-step “inhibition-grafting” method was established to graft polydimethylsiloxane (PDMS) onto the surface of DNS-2 (a kind of dispersible nano-silica with network structure) to yield nano-SiO<sub>2</sub>/PDMS high-performance nanocomposites. Their microstructure and chemical structure were characterized by TEM, GPC, FTIR and TGA. The viscosity and rheological properties were evaluated, and their mechanical properties of the as-prepared nano-SiO<sub>2</sub>/PDMS elastomers were measured as well. Findings indicate that PDMS chains are grafted on the silica surface *via* covalent bonding and the

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