ABSTRACT

The blends of silicone rubber and fluororubber based on tetrafluoroethylene/propylene/vinylidene fluoride terpolymer are vulcanizable by the peroxide vulcanizing system. Though the blend components are thermodynamically immiscible, they are technologically compatible. The processability of the fluororubber can be improved on blending with low viscous silicone rubber. Blend morphology consists of the continuous silicone rubber phase with the fluororubber as the dispersed phase. While the flammability characteristics of the blend is controlled by the continuous phase, its hot oil resistance is inbetween the constituent rubbers.

The silicone rubber vulcanizate powder (SVP) of average particle size of 3 μm and the fluororubber vulcanizate powder (FVP) of average particle size of 1μm exist in highly aggregated structures, which breakdown on milling operation. XPS and FTIR spectroscopic studies reveal that there are no chemical changes on the particle surface on mechanical grinding of the thick rubber sheet, aged under different conditions to simulate the factory storage and service conditions. Incorporation of SVP into the silicone rubber increases the viscosity, but decreases the mechanical properties. But the decrease (even at a loading of 60 phr, it is less than 20%) is much less than that normally observed in rubber compounds filled with powders obtained by the conventional cryogenic or ambient grinding techniques. When FVP is incorporated into the fluororubber, changes in processing and final vulcanizate properties are insignificant even at a loading of 100 phr, indicating usefulness of the powder as a filler in virgin compounds. Thermal stability, flammability and hot oil resistance of the blend and the constituent rubbers remain almost unchanged on incorporation of the vulcanizate powders.

Key words: Silicone rubber; Fluororubber; Fluorosilicone rubber; Blends; Technological compatibility; Flammability; Hot oil resistance; Processability; Mechanical properties; Rubber powders.