

Superparamagnetic Si_3N_4 -Fe containing ceramics prepared from polymer-metal complex

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The functional non-oxide ceramics derived from liquid ceramic precursors with transition metal compounds have been studied to use at mechanically harsh conditions and high temperature. Although the synthetic routes of functional ceramics are challenging due to the reactivity and chemical properties of elements, we introduced a simple route to fabricate the magnetic non-oxide ceramics with commercially available sources. After dissolving ferric chlorides in THF completely, the polyvilylsilazane (PVS) was added to the solution. The molecular weight started increasing within a few minutes at room temperature, and colored in dark yellow. The particles of mixed compound were obtained by evaporizing THF. Curing at 130°C was followed, and the cured compound was pyrolyzed in the 500-1000°C temperature range under a nitrogen atmosphere. The obtained ceramic were analyzed by XRD, FT-IR, TGA and TEM.