Inclusion of [H3PW12O40] and [H4SiW12O40] into a silica gel matrix via "sol-gel" methodology

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Here we report the inclusion of two Keggin Polyoxometalates (POMs), [H3PW12O40] and [H4SiW12O40], into silica gels by integrating them during the preparation of the SiO2 matrix via "sol-gel" methods. Aerogels were produced by supercritical drying of the wet gels impregnated with the POMs, and lyogels were obtained by means of a lyophilization process. These materials were characterized by scanning electron microscopy (SEM), transmission electron microscopy (TEM), Fourier transformed infrared (FT-IR) spectroscopy and thermoanalytical techniques (TGA-DSC). We found that a large fraction of POMs are lost during the aging time, and solvent exchange for lyophilization. However the thermal stability of the bare matrix is modified by the inclusion of POMs. Some aggregates with a high content of POMs were found via SEM-EDX.

Aerogel

Keggin

Lyogel

Polyoxometalates

Silica gel