

103-006

COMPÓSITOS DE MATRIZ DE SÍLICA REFORÇADOS COM FIBRAS NATURAIS DE SÍLICA AMORFA

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This work reports on the characterization of natural amorphous silica fibers (NASF) reinforced particulate amorphous silica/borosilicate glass (particle size < 5 µm) matrix composites. Well mixed NASF (0 - 50 vol%), borosilicate glass and bentonite (3 wt%) powders (humidified with 5 wt% water) were uniaxially pressed (100 MPa). Subsequently, the obtained compacts were dried (110 °C/2 h) and fired (900 - 1200 °C/30-120 min) at 10 °C/min in an oxidant atmosphere. The raw materials and the obtained composites were characterized on the point of view of their typical physical/mechanical and chemical properties. Results showed that, according to SEM observations, the NAS fibers are characterized by an acicular shape with a mean diameter of 10 µm and lengths ranging from 200 to 600 µm. Moreover, the silica fibers are hollow with innerdiameters below 1µm. Furthermore, the obtained composites have shown relatively strong interfacial bonds between matrix and fibers, which leads to a brittle fracture without significant fiber pullout.