ABSTRACT

Vacuum and squeeze infiltration has been used to prepare SiC particulate reinforced Al/Mg and SiC, C-fiber and *in-situ* Mg_2Si reinforced hybrid Mg alloy based metal matrix composites, respectively. The aim is to characterize the interface between the reinforcement and the matrix material through dispersion measurement quantified as interparticle distance, microhardness measurement, tribological and thermal expansion studies. These characteristic properties have been correlated with parameters affected by changing the wettability between the matrix material and the reinforcement, such as preform preheat temperature, melt temperature and surface modification of the SiC particles by coating with Ni, Cu and SiO_2. The change in wettability by surface modification has been shown to affect the interparticle distance and wear properties. In the case of hybrid composite, thermal expansion studies have been carried out in both longitudinal and transverse direction to the carbon fiber alignment to study the effect of change in CTE value with respect to fiber alignment. A model has been developed to understand the saturation of thermal expansion after a few heating and cooling cycle in the case of hybrid composite. It has been found that infiltration either through imposed pressure on the melt or its suction by vacuum through bed of preform of reinforcement of SiC particulate and carbon fibers of various sizes leads to good quality interface, which does not show serious degradation during wear or on exposure to thermal cycling. Thus, it can be shown that it is the intimate contact between the reinforcements and the matrix, either by suction of gas through preform or by applying pressure that is useful in obtaining good and effective wettability that enhances the interface quality.

Key words: *Cast composites, Hybrid, Reinforcement, Matrix, Infiltration, Interface, Wear, Dispersion, Microhardness, Wettability, Thermal cycling, CTE.*