

A Study on Fabricating Metal Composite Foam Panels with the Use of Clay Fillers for the Control of Cell Structure

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Sandwich-structure composites, consisting of cellular polymeric core laminated with thin metal facings, have been attracting interests in wide range of industries where high strength and stiffness as well as low weight are essential design requirements. This study was performed on aluminum/foamed polypropylene (PP) panels to investigate the effect of addition of clay fillers in PP on cellular size and mechanical properties of the composites. PP samples with and without clay fillers were prepared into sheet form using a twin screw extruder in various kneading conditions, followed by adhering to aluminum plates and heat-foaming of PP. Composites clay-filled PP showed much higher expansion rate in the course of heat foaming and larger final expansion ratio, than composites without fillers. Observation of cell structures by X-ray CT scanner revealed that the ways of cell growth were much different in those two samples. Adding fillers restrained coalescence of cells and helped to make uniform cell structure with the increase of cell density. Longer period of kneading, resulting better dispersion of fillers in PP, was found to be also effective for uniform cell growth and achieving higher expansion ratio.