

Production of Low-Density Nanocellular Foam Based on PMMA/PEBAX Blends

Authors : Nigus Maregu Demewoz, Shu-Kai Yeh

Abstract : Low-density nanocellular foam is a fascinating new-generation advanced material due to its mechanical strength and thermal insulation properties. In nanocellular foam, reducing the density increases the insulation ability. However, producing a nanocellular foam of densities less than 0.3 with a cell size of less than 100 nm is very challenging. In this study, poly (methyl methacrylate) (PMMA) was blended with Polyether block amide (PEBAX) to study the effects of PEBAX on the nanocellular foam structure of the PMMA matrix. We added 2 wt% of PEBAX in the PMMA matrix, and the PEBAX nanostructured domain size of 45 nm was well dispersed in the PMMA matrix. The foaming result produced a new generation special bouquet-like nanocellular foam of cell size less than 50 nm with a relative density of 0.24. Also, we were able to produce a nanocellular foam of a relative density of about 0.17. In addition to thermal insulation applications, bouquet-like nanocellular foam may be expected for filtration applications.

Keywords : nanocellular foam, low-density, cell size, relative density, PMMA/PEBAX blend

Conference Title : ICMSE 2023 : International Conference on Materials Science and Engineering

Conference Location : New York, United States

Conference Dates : October 09-10, 2023