OP-18-283

Friday, May 13, 2011, 12:10-12:30 pm
Room: Karam 4

RHEOLOGY – COALESCENCE OF SILICON FOAMS

M.C. Dib Jawhar[a, *], P. Cassagnau[a], P. Chaumont[a]

[1]*Ingénierie des matériaux polymères (IMP), 15 Boulevard A. Latarjet, 69622, Villeurbanne, France*

*marie-claire.dib@hotmail.fr

A foam sample is assumed to be a set of bubbles embedded into a polymeric matrix with an initial gas overpressure. Silicon foams are produced by a competition between two reactions involving the hydrogenosilane functions carried by the polymer precursor: the first reaction generates gas (initiating cell formation) while the other one, hydrosilylation, well known and controlled in silicon, leads to the crosslinking of the rising foam. Thus, obtaining enhanced foam properties requires a good balance between two reactions, crosslinking and gas generation. On the other hand, the final characteristics of the foam (porosity, bulk density…) largely depend on the rheology of the mix (appropriate elongational properties) as well as the added fillers.
Nucleation and cell growth were carried out under optical microscopy. The experiments show that the main phenomenon controlling cell growth is bubble coalescence. Due to the surface effects and the viscoelastic properties, bubbles approach from each other and get deformed giving birth to an intermediate shape before reaching their final geometry.
Many parameters have direct effect on foam properties. In fact, dissolved gas in formulas as well as the air introduced during manual mixing, reduce the skin effect and guarantee a homogeneous cell size distribution and a better foam structure.