

Effect of Blowing Agent on the Foam Structure of Polyvinyl Alcohol

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ABSTRACT

Polyvinyl alcohol (PVOH) is an environmentally friendly water soluble polymer with applications in biodegradable films and injection moulded articles. The objective of this research was to study the effect of different quantities of blowing agents in an alumina filled PVOH. The resulting foam structures were studied in the presence of different titanate coupling agents in the polymer system. Chemical blowing agents as additives in water soluble polymers are of significant technical importance for providing production, economic and physical properties improvements. Well characterised grades of blowing agents and coupling agents were studied with PVOH. The additives were mixed and injection moulded in a horizontal hydraulic machine and the processing conditions of the polymer with and without blowing agents were optimised for injection speed, holding pressure, holding time and shot size. The resulting injection moulded samples were fractured and the morphology of the foams was studied by scanning electron microscopy (SEM). Studies were made to determine the effect of the coupling agent on the foam structure. The presence of blowing agents helped in significantly reducing the density and also increased the solubility rate. It was observed that the foam structures were most uniform with 2 wt-% of the blowing agent and 0.2% wt-% of the coupling agent.

Keywords: Polyvinyl alcohol (PVOH), blowing agents, coupling agents, solubility, SEM