

The study of microstructure process using hot embossing

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ABSTRACT

In recent years, plastics have begun to show great commercial potential especially in manufacturing microstructured parts. Injection molding and hot embossing are two major microfabrication methods. Replication accuracy was investigated for these two methods. Polymethyl methacrylate (PMMA) was used as the polymer substrate. The mold insert (or master) was fabricated by LIGA-type method. Hot embossing was found to have better replication accuracy for microstructure than injection molding does. This research describes the application of hot embossing to produce parts with microstructure. An embossing machine, designed for microfabrication, was used to emboss PMMA substrate. Injection molding was also applied for comparison. Both the injection molded part and the hot embossed part were observed under microscope to compare the replication accuracy. During the production process, it is imperative to found out one set of appropriate processing parameters for the hot embossing so as to obtain better product quality. In the conventional parameter adjustment, most of them are adjusted by try and error method that has usually wasted lots of time and cost. Therefore, it is necessary to develop a wisest method (ex: Taguchi's quality method).

Keywords : injection molding、 hot embossing、 microstructure

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