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Molding of Thin Sheets Using Impact Micro-injection Molding

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The micro-injection molding is used to fabricate ultra-thin polymeric components used in optoelectronics and biotechnology. Due to the extremely high flow resistance and fast heat transfer, ultra-thin parts is difficult to mold. In this study, a lab-made impact type micro-injection machine and a rapid heating/cooling system are used to perform the micro-injection molding. A mold with test-sheet cavities of thickness 100 μ m and 200 μ m are constructed. The molding capacity and the effects of processing conditions are systematically investigated. The processing conditions include the mold temperature, air pressure of accelerating cylinder, and air pressure of packing cylinder. The thicker parts have larger operation window. The high mold temperature reduces the area of short shot but induces more shrinkage and sink mark. The increase of air pressure in accelerating and packing cylinders can effectively reduce shrinkage.