



### SKIN-CORE CRYSTALLINE STRUCTURE OF MICRO INJECTION MOLDED POM AND HDPE

Musa R. Kamal<sup>1</sup>, Jingsong Chu<sup>2,3</sup>, Abdesslem Derdouri<sup>3</sup> and Andrew Hrymak<sup>4</sup>

*<sup>1</sup>Chemical Engineering Department, McGill University, Montreal, QC, Canada, <sup>2</sup>Micromolding Solutions Inc., CIMI, Boucherville, <sup>3</sup>Industrial Materials Institute, National Research Council Canada, Boucherville, QC, Canada, <sup>4</sup>Faculty of Engineering, The University of Western Ontario, ON, Canada*

Two semi-crystalline polymers, high density polyethylene (HDPE) and polyoxymethylene (POM), were subjected to micro injection molding under various processing conditions. A rectangular bar having a thickness of 300  $\mu\text{m}$  was used as a test part to study the morphology development during molding. Thin sections normal and parallel to the main flow direction were observed under cross-polarized light using an optical microscope. Distinctive morphological zones across the part thickness were identified and analyzed in terms of the molding conditions and position with respect to the gate. The variation of bulk tensile properties and local mechanical properties, such as modulus and hardness, obtained by nanoindentation, was measured and related to morphological characteristics. The morphological characteristics and mechanical properties of the two materials will be compared with each other and with results reported for macroscopic parts obtained by conventional injection molding. Some of the observed differences will be explained.