

# Accepted Manuscript

Research Paper

Formation mechanism of porous structure in plastic parts injected by microcellular injection molding technology with variable mold temperature

Lei Zhang, Guoqun Zhao, Guilong Wang

PII: S1359-4311(16)33658-4

DOI: <http://dx.doi.org/10.1016/j.applthermaleng.2016.11.180>

Reference: ATE 9591

To appear in: *Applied Thermal Engineering*

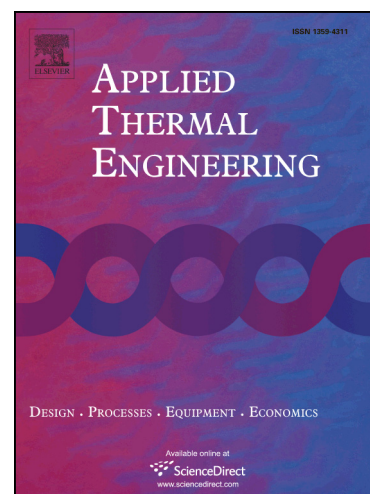
Received Date: 6 April 2016

Revised Date: 12 October 2016

Accepted Date: 26 November 2016

Please cite this article as: L. Zhang, G. Zhao, G. Wang, Formation mechanism of porous structure in plastic parts injected by microcellular injection molding technology with variable mold temperature, *Applied Thermal Engineering* (2016), doi: <http://dx.doi.org/10.1016/j.applthermaleng.2016.11.180>

This is a PDF file of an unedited manuscript that has been accepted for publication. As a service to our customers we are providing this early version of the manuscript. The manuscript will undergo copyediting, typesetting, and review of the resulting proof before it is published in its final form. Please note that during the production process errors may be discovered which could affect the content, and all legal disclaimers that apply to the journal pertain.



# Formation mechanism of porous structure in plastic parts injected by microcellular injection molding technology with variable mold temperature

Lei Zhang, Guoqun Zhao\*, Guilong Wang

## Abstract

Microcellular Injection Molding (MIM) process combined with rapid heat cycle molding (RHCM) technique can fabricate microcellular foamed plastic parts with excellent surface appearance. The porous structure influences the foamed parts' performances significantly and its evolution process is very complex in RHCM/MIM process. The temperature field and flow field play a very crucial role in determining the porous structure of the foamed parts. In this study, we developed a non-isothermal mathematical model based on the two-phase model to calculate the temperature field and flow field in RHCM/MIM process. Particularly, the coupling heat transfer between the injection mold and the polymer melt is considered by using the implicit domain coupled algorithm. By comparing with the experimental results, it is found that the developed model can predict the temperature field very accurately. The thermal response characteristics in RHCM/MIM process were further analyzed. By combining the simulation results with the cellular morphology obtained by experiments, we deeply analyzed the formation mechanisms of the cellular morphology in RHCM/MIM process.

Keywords: multiphase flow; rapid heat cycle molding; microcellular injection molding.

\* Corresponding author:

Guoqun Zhao, Key Laboratory for Liquid-Solid Structural Evolution and Processing of Materials (Ministry of Education), Shandong University, Jinan, Shandong 250061, PR China.

Tel. +86-531-88393238, Fax. +86-531-88392811, Email: zhaogq@sdu.edu.cn

Download English Version:

<https://daneshyari.com/en/article/4991972>

Download Persian Version:

<https://daneshyari.com/article/4991972>

[Daneshyari.com](https://daneshyari.com)