

Accepted Manuscript

Isotactic Polypropylene Reinforced Atactic Polypropylene by Formation of Shish-kebab Superstructure

Zheng-Chi Zhang, Liang Deng, Jun Lei, Zhong-Ming Li



PII: S0032-3861(15)30275-5

DOI: [10.1016/j.polymer.2015.09.070](https://doi.org/10.1016/j.polymer.2015.09.070)

Reference: JPOL 18156

To appear in: *Polymer*

Received Date: 5 March 2015

Revised Date: 10 September 2015

Accepted Date: 27 September 2015

Please cite this article as: Zhang Z-C, Deng L, Lei J, Li Z-M, Isotactic Polypropylene Reinforced Atactic Polypropylene by Formation of Shish-kebab Superstructure, *Polymer* (2015), doi: 10.1016/j.polymer.2015.09.070.

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.

1 **Isotactic Polypropylene Reinforced Atactic Polypropylene by** 2 **Formation of Shish-kebab Superstructure**

3 Zheng-Chi Zhang, Liang Deng, Jun Lei*, Zhong-Ming Li*

4 College of Polymer Science and Engineering, State Key Laboratory of Polymer Materials
5 Engineering, Chengdu 610065, Sichuan University, China

6 *E-mail address:* leijun@scu.edu.cn, zmli@scu.edu.cn

7 ***Corresponding author. Zhong-Ming Li**, College of Polymer Science and Engineering,

8 State Key Laboratory of Polymer Materials Engineering, Chengdu 610065, Sichuan University,

9 China. Telephone: 86-28-85406866, Fax: 86-28-85405402, E-mail: zmli@scu.edu.cn

10 Jun Lei, College of Polymer Science and Engineering, Chengdu 610065, Sichuan University,

11 China. Telephone: 86-28-85400211, Fax: 86-28-85405402, E-mail: leijun@scu.edu.cn

12 **Abstract.** To make large scale, effective use of atactic polypropylene (aPP),
13 normally regarded as industry waste, isotactic polypropylene (iPP) was blended with
14 aPP with a guiding ideology of “structuring processing”. Herein, the aPP/iPP blends
15 were melt processed through modified injection molding, i.e., oscillation shear
16 injection molding (OSIM), in which an oscillation shear flow field was applied to
17 induce self-reinforcing oriented iPP crystals. With addition of only 30 wt% iPP, the
18 tensile strength of the blend could increase from 1.6 MPa for neat aPP to 26.6 MPa,
19 which is comparable to that of conventionally injection molded high density
20 polyethylene. Further increasing iPP content to 50 wt%, the tensile strength of OSIM
21 aPP/iPP sample rose up to 41.6 MPa, already higher than those of industrial-scale
22 extruded and injection-molded iPP. The results of wide-angle X-ray diffraction
23 (WAXD), small-angle X-ray scattering (SAXS), differential scanning calorimetry
24 (DSC) and scanning electron microscopy (SEM) testified that the increased
25 enhancement of mechanical performance of OSIM blend with the increase of iPP
26 content can be ascribed to the progressive formation of iPP shish-kebab networks. It is

Download English Version:

<https://daneshyari.com/en/article/5179981>

Download Persian Version:

<https://daneshyari.com/article/5179981>

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