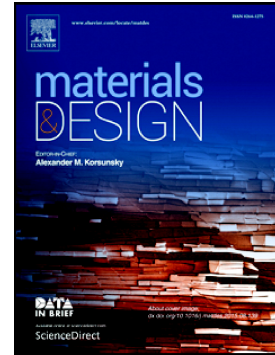


## Accepted Manuscript

The novel high performance aramid fibers containing benzimidazole moieties and chloride substitutions

Longbo Luo, YihaoYuan, Yu Dai, Zheng Cheng, Xu Wang, Xiangyang Liu



PII: S0264-1275(18)30640-3  
DOI: doi:[10.1016/j.matdes.2018.08.025](https://doi.org/10.1016/j.matdes.2018.08.025)  
Reference: JMADE 7323  
To appear in: *Materials & Design*  
Received date: 3 May 2018  
Revised date: 10 August 2018  
Accepted date: 11 August 2018

Please cite this article as: Longbo Luo, YihaoYuan, Yu Dai, Zheng Cheng, Xu Wang, Xiangyang Liu , The novel high performance aramid fibers containing benzimidazole moieties and chloride substitutions. *Jmade* (2018), doi:[10.1016/j.matdes.2018.08.025](https://doi.org/10.1016/j.matdes.2018.08.025)

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.

# The novel high performance aramid fibers containing benzimidazole moieties and chloride substitutions

Longbo Luo   Yihao Yuan   Yu Dai   Zheng Cheng   Xu Wang

Xiangyang Liu\*

State key laboratory of polymer material and engineering, College of Polymer science and engineering, Sichuan University, Chengdu 610065, P. R. China

Corresponding author. Tel.: +86 28 85403948; fax: +86 28 85405138

*E-mail address: lxy6912@sina.com (Xiangyang Liu).*

## Abstract

As one of the most important high-performance fibers, the facing challenges of poly(p-phenylene terephthalamide) fibers are the poor compressive properties and weak adhesion with resins. Here we fabricated a novel high performance aramid fiber containing benzimidazole moieties and chloride substitutions. The results of Fourier transform infrared spectra indicate the presence of benzimidazole moiety strengthens hydrogen bonds. The results of insolubilization in H<sub>2</sub>SO<sub>4</sub> and electron paramagnetic resonance spectra of the captured radical intermediate indicate chemical crosslinking reaction occurs during heat treatment, and the degree of crosslinking shows an increasing trend with increasing chloride substitutions. The aggregation structure of aramid fibers obtained is studied in detail. The fibers show excellent tensile strength (2.58~3.42 GPa) and initial modulus (88.4~112.0 GPa). What is more, the values of compressive strength of those aramid are highly improved owing to the reinforcement of cohesive strength resulting from crosslinking and strong hydrogen bonding interactions. The highest compressive strength is 51.5% higher than that of poly(p-phenylene terephthalamide) fibers. Interestingly, interfacial shear strength of those

Download English Version:

<https://daneshyari.com/en/article/7216736>

Download Persian Version:

<https://daneshyari.com/article/7216736>

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