

## Comparative Study of Isomeric Polyimides

Min Zhang<sup>a, b</sup>, Guiyan Zhao<sup>a, b</sup>, Zhen Wang<sup>b</sup>, Wei Jiang<sup>b</sup>, Xiangling Ji<sup>b</sup>, Lianxun Gao<sup>b</sup>,  
Mengxian Ding<sup>b\*</sup>

<sup>a</sup>State Key Laboratory of Polymer Physics and Chemistry, Changchun Institute of Applied Chemistry, Chinese Academy of Sciences, Changchun, 130022, China

<sup>b</sup>Graduate School of Chinese Academy of Sciences, Beijing, China

### *Abstract*

A series of isomeric polyimides based on ODA and the corresponding isomeric dianhydrides, (3,3'-, 3,4'-, 4,4'-)ODPAs, TDPAs, HQDPAs, and BPADAs were prepared. The properties, such as the thermal and mechanical behavior, dynamic mechanical behavior, and the rheological properties were compared among the same set of the isomeric polyimides. The glass-transition temperatures decreased in the order 3,3'- > 3,4'- > 4,4'-polyimide. The polyimides from 3,4'-ODPA, TDPA and 3,3'-HQDPA exhibited the lower melt viscosity than the others. Furthermore, the crystallization behaviors of the polyimides from isomeric ODPAs and TDPAs were studied. From the WAXS and DSC study, the polyimide based on 4,4'-ODPA/ODA showed crystalline at 260-370°C, the T<sub>m</sub> was at about 380-390°C, and the crystalline became obvious with the molecular weight decreasing. Neither the polyimides based on 3,4'-ODPA/ODA and 3,3'-OPDA/ODA nor isomeric TDPA/ODAs showed crystalline at whole temperature range studied.