

Abstract Submitted  
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**Roles of Low Molecular Weight Amide on Crystallization Behavior of Poly (L-lactic acid)<sup>1</sup>** XIA DONG, QIAN XING, XIUQIN ZHANG, DUJIN WANG, Institute of Chemistry Chinese Academy of Sciences — Organic nucleating agents play an important role in enhancing the crystallization rate of polymers. The aim of this study is to investigate the effect of low molecular weight aliphatic amides on the crystallization behavior and mechanism of poly (L-lactic acid) (PLLA). The crystallization rate of PLLA during non-isothermal crystallization and isothermal crystallization has been significantly improved with the addition of N, N'-ethylenebis (12-hydroxystearamide) (EBH) and/or N, N'-ethylenebisstearamide (EBSA), and EBH exhibits stronger nucleating ability. Time-resolved FTIR spectra illustrate the chain conformational changes and the crystallization kinetics during isothermal crystallization of PLLA mixtures and pure PLLA, especially in the early stages. The formation of interchain conformational-ordered structure and intrachain 103 helix structure for amide-doped PLLA precedes that of pure PLLA, suggesting a stimulatory nucleating effect of EBH and EBSA. In the case of PLLA/EBH, the interchain interactions of -(COC+CH<sub>3</sub>) and -CH<sub>3</sub> groups are faster than the -(CH<sub>3</sub>+CC) intrachain interactions, while the interchain interactions and the intrachain 103 helix formation are nearly synchronous for PLLA/EBSA, indicating that EBH has an improved effect on the nucleating ability and crystallization kinetics of PLLA, compared to EBSA. The possible mechanism has been discussed, which may be attributed to the hydrogen bond interaction between hydroxyl groups in EBH and the carbonyl groups in PLLA.

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