

## In situ compatibilization mechanism of HDPE/PET blends

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Transesterification reaction is usually generated in the polyester family, it may lead to the formation of copolymers, primarily located at the interface, whose role in interfacial tension reduction and miscibility enhancement is broadly recognized in reactive processing, and the production of such a interfacial agent during melt compounding presents a major economic advantage.

HDPE and PET are known to be incompatible polymers. To improve the properties of HDPE/PET blends, ethylene vinyl acetate copolymer(EVA) and ethylene acrylic acid copolymer(EAA) are used as compatibilizers in this system<sup>[1]</sup>. Owing to chemical structure similarities, EVA and EAA display some miscibility with HDPE. On the other hand, ester groups with EVA and carboxyl groups with EAA can react with the polyester macromolecules and form PET-EVA, PET-EAA copolymers as compatibilizers in situ during reactive processing through twin screw extruder by transesterification reactions in the presence of catalyst—organometallic compound. This opens a new route to compatibility for polymer blends<sup>[2]</sup>.

The in situ compatibilization mechanism of HDPE/PET blends by transesterification in reactive extrusion is discussed in this paper. This is illustrated in the following, some grafted or co-crosslinked copolymers PET/EVA, PET/EAA were generated at the interface of blends by transesterification during processing operation with organometallic compound, which enhanced the compatibilization of HDPE/PET blends. <sup>1</sup>H-NMR, FTIR, DSC analysis and rheometer tests showed that transesterification reaction between PET and EVA led to a grafted copolymer mainly, and a co-crosslinked copolymer generated mainly for PET/EAA blend.

### References

- 1 Wissler G E. Comingled plastics based on recycled soft drink bottles[C]. SPE ANTEC'90 Dallas: 1990 1 434
- 2 Pesneau I, Liauro M F, Gregoire M, et al. Morphology control of polyester-polyolefin blends by transesterification during processing operations in the presence of dibutyltin oxide[J]. J Appl Polym Sci, 1997, 65:2 457

**HDPE/PET 共混体系的原位增容机理** 何慧 沈家瑞 黄庙由 (华南理工大学高分子材料科学与工程系, 广州, 510641) 在 HDPE/PET 共混体系反应挤出原位增容的过程中, 增容剂 EVA, EAA 侧基上的官能团与 PET 分子链上的酯基在有机金属化合物的催化下发生了酯交换反应, 其作用机理存在差别: EVA 与 PET 之间的相互作用主要生成 PET/EVA 接枝共聚物, 而 EAA 与 PET 则主要生成共交联共聚物。关键词: 高密度聚乙烯; 聚对苯二甲酸乙二醇酯; 共混物; 酯交换反应; 原位增容机理

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