

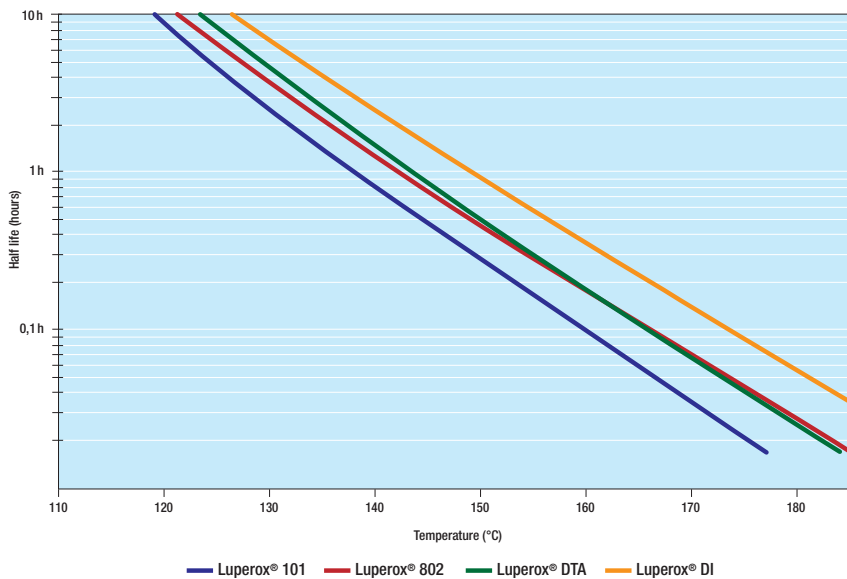
Luperox[®] 聚丙烯流变改性

有机过氧化物的选择指南

在挤出过程中添加有机过氧化物到熔融的聚丙烯，称为聚丙烯的流变改性或可控流变(CRPP)。目的是改善聚丙烯(PP)在聚合反应后的熔体流动性。

有机过氧化物可以一种液体（纯的或用溶剂稀释不同浓度）形态或作为一种固体形态称之为母料（过氧化物被吸收或覆在聚丙烯载体）加入加料斗或者挤出机中。

图 1: 半衰期 Vs 温度



有机过氧化物用于PP改性的主要优势：

- 对于熔融指数 (MFI) 增加出色控制;
- 较窄的分子量分布 (MWD) ;
- 在操作温度下, 有机过氧化物的效率;
- 获得要求MFI的低成本工艺;
- 可以用一种PP树脂制造一系列牌号;
- 增加PP树脂的透明和更好的热变形

图2: 用于CRPP的有机过氧化物

牌号	1min 半衰期温度(°C)	活性氧 (%)	存储温度 (°C)	优点
Luperox [®] 101	181	10.0	<30	高效, 有液体和固体配方形态
Luperox [®] PPX	-	9.5	<30	高效, 低气味
Luperox [®] DTA	184	8.7	<30	无叔丁基副产物
Luperox [®] 802*	185	9.0	<30	高效
Luperox [®] DI	193	10.9	<30	性价比高

* 只有母料

图3 : CRPP工艺

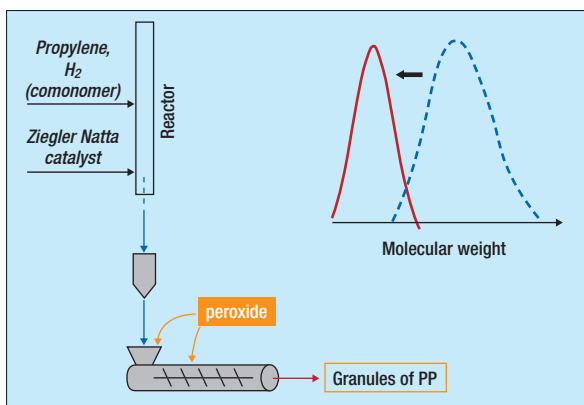
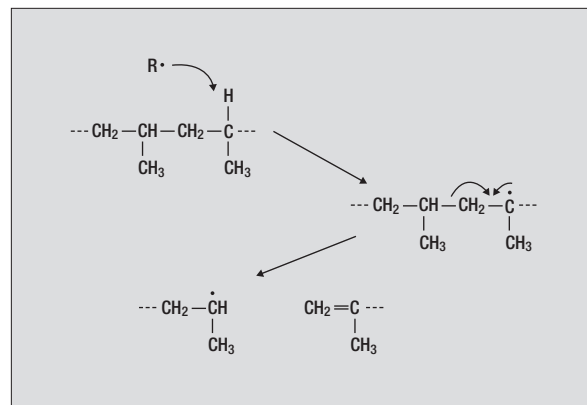
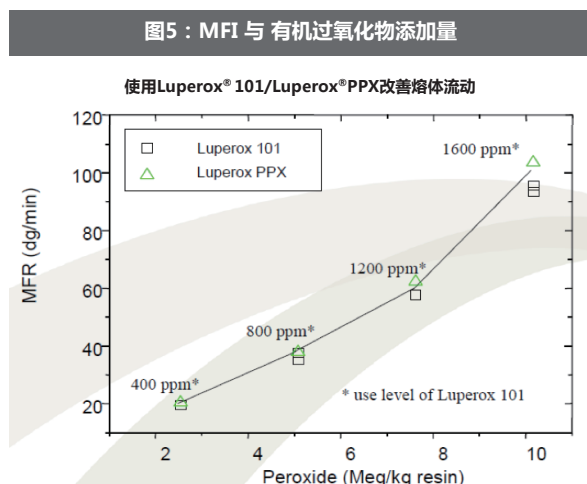


图4: 聚丙烯分子链的改性



有机过氧化物的添加量与MFI的关系如图5所示



一系列有机过氧化物配方:

过氧化物稀释级的主要优点是提供一个更准确的剂量控制和一个更好的混合均匀性,尤其是当所需的过氧化物的数量很低。为了使使用者更容易控制用量,这些不同配方的有机过氧化物可在较大的包装像固体大袋供应(200公斤)或IBC(1吨)的液体。当必须添加固体过氧化物时,阿科玛提供两种母粒如粉和球形颗粒。基于LUPEROX®101和LUPEROX®802的各种固体或液体过氧化物与分散体,其不同浓度的产品如图6所示。

固体过氧化物分散体提供如下优势:

- **生产率:** 投料精准,在挤出机中分散良好;
- **质量:** 无结块和可接受的气味水平;
- **操作:** 自由流动的粉末;
- **安全:** 低风险。

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选择有机过氧化物的主要标准:

- 注射技术(液体或固体过氧化物级);
- 挤出机温度(200-250°C): 240°C以上,热降解变得显著;
- 挤出机停留时间:在给定的工艺温度下,需要过氧化物的8-10半衰期达到过氧化物的完全分解;
- 最终聚丙烯的MFI和MWD性能;
- 可接受的残留过氧化物水平。

Luperox® 101 和 Luperox® 802 配方

配方	纯度	物理形态	平均尺寸
Luperox® 101M050	50%	液态	-
Luperox® 101PP7.5	7.5%	粉末或颗粒	700 µm or 2-3 mm
Luperox® 101PP10	10%	粉末或颗粒	700 µm or 2-3 mm
Luperox® 101PP20	20%	颗粒	2-3 mm
Luperox® 802PP10	10%	粉末	700 µm
Luperox® 802PP20	20%	粉末	700 µm
Luperox® 802PP40	40%	粉末	700 µm

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