

## 纳米氧化锌的表面修饰及其机理的研究

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### 摘要

采用改进的直接沉淀法制备了 $\Phi 10\text{nm}$ 氧化锌. 分别用油酸(OA), 山梨醇酐单硬脂酸酯(Span-60), 月桂酸钠(SL)三种表面活性剂修饰纳米氧化锌颗粒. 宏观沉降实验分析了修饰后的纳米氧化锌在液体石蜡中的稳定性, 发现油酸修饰的纳米氧化锌能在液体石蜡有机相中长时间分散而不沉淀, 具有优异的修饰效果, 而山梨醇酐单硬脂酸酯和月桂酸钠则无法长期稳定存在于有机相中; 微观红外光谱分析表明, 油酸与纳米氧化锌以共价键和氢键两种形式结合, 在无机纳米颗粒表面形成单分子膜; 而山梨醇酐单硬脂酸酯和月桂酸钠的修饰则不牢固.

关键词 [氧化锌](#) [表面修饰](#) [油酸](#) [氢键](#)

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## Surface Modification for Nano-ZnO and Its Mechanism

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**Abstract** Nano-ZnO was synthesized by an improved direct precipitation method, followed characterization by both of XRD and TEM. It demonstrates that the diameter of nano particles is 10nm calculated with Scherrer formulate and observed with the photo of TEM. The nano particles were modified with oleic acid, span-60 and sodium laurate, respectively. Macroscopically, the stability of the nano particles was analyzed by the subsidence experiment and discussed the stability of the modified nano-ZnO by the three surfactants. The effect of modification with oleic acid is excellent and the others can not exist in liquid paraffin stably. Microcosmically, the FT-IR spectra indicate that nano particles combine with oleic acid by both types of covalent bond and hydrogen bond to form a singlemolecule layer, but the modification with span-60 and sodium laurate is not stable.

**Key words** [zinc oxide](#) [surface modification](#) [oleic acid](#) [hydrogen bond](#)

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