

材料化学工程与纳米技术

## 改性硅溶胶憎水薄膜的制备

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摘要

从接触角变化的角度研究了甲基三甲氧基硅烷(MTMS)、乙烯基三乙氧基硅烷(ETES)、 $\gamma$ - (甲基丙烯酰氧基)丙基三甲氧基硅烷(MPMS)等不同端官能团硅烷偶联剂改性硅溶胶制备的杂化溶胶; 采用MPMS改性 $TiO_2$ 制备了 $TiO_2-SiO_2$ /丙烯酸羟丙酯杂化溶胶, 采用紫外固化工艺在玻璃表面制备了憎水薄膜。采用傅里叶红外光谱(FTIR)、扫描电子显微镜(SEM)、接触角测试仪等手段对薄膜的结构与性能进行了分析与表征。研究表明: MPMS改性纳米 $TiO_2$ 与MTMS改性硅溶胶相容性良好, 通过在MTMS改性硅溶胶中添加改性纳米 $TiO_2$ 含量为0.1%时, 薄膜水接触角最大可达 $140^\circ$ 左右。在玻璃表面涂膜前后光学性能无明显变化, 具有广泛的应用前景。

关键词

[硅烷偶联剂](#) [硅溶胶](#) [涂膜](#) [憎水性](#)

分类号

## Preparation of hybrid coating for glass surface

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### Abstract

Through the determination of contact angle, the  $SiO_2$ /HPA hybrid sol was studied by changing the kinds of silicane coupling agents, such as MTMS, ETES, and MPMS.  $TiO_2-SiO_2$ /HPA hybrid sol was prepared by means of surface modification of nano  $TiO_2$  with MPMS, and then the hydrophobic coating for the glass surface was prepared by the UV curing technique. The structure and properties of the coating were characterized by means of FTIR and SEM and contact angle instrument. The study showed that  $TiO_2$  modified with MPMS and silica gel modified with MTMS are completely miscible. If modified  $TiO_2$  at a content of 0.1% was added into modified silica sol, the maximum contact angle of coating would reach  $140^\circ$ . Furthermore the optical performance had no visible change before and after coating the glass.

### Key words

[silicane coupling agent](#) [silica sol](#) [coating](#) [hydrophobicity](#)

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