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A simple sol–gel method to prepare superhydrophilic silica coatings

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Abstract

A highly transparent and mechanically robust superhydrophilic silica coating was prepared by sol-gel method followed by calcination, using tetraethoxysilane (TEOS) as precursor and hydrochloric acid (HCl) as catalyst. The superhydrophilic coating showed excellent anti-fogging characteristic in humid environment. The effect of calcination on the microstucture and chemical composition of the coating was discussed in detail. This transparent and mechanically robust superhydrophilic coating can find potential application in windshields, eyeglasses and solar cells.

Keywords: sol-gel preparation, thin films, superhydrophilic, transparent, mechanically robust, anti-fogging

1. Introduction

Surfaces that are completely and instantaneously wet by water (water droplet contact angle $<5^{o}$ within 0.5 s or less), named as superhydrophilic surfaces, have great potential in terms of antifogging, self-cleaning and biocompatible applications [1-5].