عنوان مقاله:

Facile Preparation and Characterization of SiO۲ Nanoparticles and Study of the Relation Between Contact Angle and Different Parameters

محل انتشار:

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خلاصه مقاله:

Background: Superhydrophobic materials which have contact angle higher than ۱۵۰°, considering their widespread applications, are very important for researchers. Method: In this research, silica nanopowder was synthesized successfully using inexpensive sodium silicate source and very simple and facile method. Synthesis of hydrophobic solution was carried out by sol-gel method. The surface modification of silica nanopowder was performed using different silane/siloxane polymers and was deposited on glass slides. For characterization of the samples XRD, FESEM, EDX, TEM, FTIR, and Raman analysis were used. Results: The XRD result shows a very wide peak at ۲q = ۲۴.۷° which indicates the amorphous nature of the silica particles. The results of the performed characteristics confirm the synthesis of silica nanopowder with the size of less than ۲۵ nm. The EDX spectrum shows that only Si and O elements are present in the structure and no impurities are visible. The contact angle between water droplet and thin films was measured and the effect of different synthesis parameters on the contact angle was studied. Among the studied polymers and solvents, the most hydrophobicity was obtained using TMCS polymer and xylene solvent. The optimized sample has a maximum contact angle of ۱۵۰.۸°. Conclusion: The synthesized thin films have .superhydrophobic properties and the method used in this research can be developed for use in industrial applications

کلمات کلیدی:

silica nanopowder, silane, siloxane, contact angle, superhydrophobic