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Characterization of sol-gel ORMOSIL antireflective coatings from phenyltriethoxysilane and tetraethoxysilane: microstructure control and application

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Abstract: Chemical structure, microstructure and properties of organically modified silicate (ORMOSIL) antireflective (AR) coatings from phenyltriethoxysilane (PTES) and tetraethoxysilane (TEOS) were characterized. The reaction between PTES and TEOS was verified by means of FTIR, XPS, and ²⁹Si NMR. N₂ adsorption-desorption analysis and TEM were utilized to investigate the pore structure and microstructure control of ORMOSIL AR coatings. It was revealed that, by increasing PTES/TEOS molar ratio, the porosity of ORMOSIL AR coating decreased and then the refractive index increased gradually from 1.21 to 1.27. The hydrophobicity of ORMOSIL AR coatings was also improved significantly by increasing the

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