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Fabrication and Characterization of Si Nanorod Arrays as Subwavelength Antireflection Structures YI-RUEI LIN, JR-HAU HE, Natl Taiwan Univ — The structure of antireflection (AR) is widely utilized to suppress undesired reflection between different optical media for various optical applications. For example, Multilayered coatings are used on the surface of optical and optoelectronic devices. However, it is also suffered from the problems such as poor adhesion, thermal instability, and lattice mismatch. An alternative to multilayered coatings is to pattern the surface with a periodically structured array with the periodicity smaller than the wavelength of the incident light. Compared with multilayered AR coatings, subwavelength structure (SWS) surfaces are more stable and durable, because the AR structures are directly etched in the surface and there are no other materials involved. So far SWSs has been fabricated on silicon have been fabricated through various methods. In the present work, we demonstrated a simple method, which combines sub-wavelength-scale monolayer spheres with a reactive ion etching process, to fabricate AR structures of Si nanorod arrays (NWAs) with structural stability, low cost and low temperature procedures. It was found that the reflectivity of Si substrates with NWAs was dramatically decreased at the wavelength of light from 400 to 800 nm. The reflectivity as a function of size of Si NWAs was discussed.

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