

Nano Silver Pavement

- Metamaterial film for heat-cut from sun light -

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We propose a new metamaterial structure “Nano Silver Pavement (NASIP)” for wavelength selective reflection film. NASIP is a structure composed of randomly dispersed silver disk-shaped thin nanoparticles (nanodisks) in monolayer on the transparency film (Fig. 1). Surface density of silver nanodisks is high but each disk is isolated like a pavement. NASIP reflects light around resonance wavelength of localized plasmon of silver nanodisks. When out of resonance, light transmits through NASIP without scattering, because pseudo periodicity of nano-discs makes scattered light coupling to only zero-order wave number (light on the axis) and evanescent wave. Wavelength of reflection light can be artificially controlled by shape, size and aspect ratio of silver nano-discs. We designed a structure for near infrared reflection and visible light transparency by using FDTD method and fabricated it by using chemical process. Fig.1 shows an electro micrograph of NASIP. We put this film to practical use for heat-cut from sun light on the window.

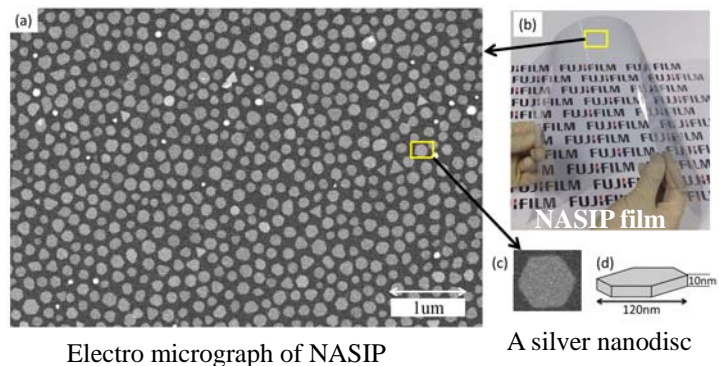


Fig.1 Nano silver pavement film



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He is a senior research scientist of Frontier Core-Technology Laboratories at Fuji Film Corporation. He received the BS and MS degrees in applied physics from the Hokkaido University in 1983 and 1985, respectively. He received the Ph.D from Hokkaido University in 2006. In 1985, he joined Fuji Film Corporation. From 1993 to 1995, while on the resister with Fuji Film Corporation, he joined the "Photon Control" project of the Kanagawa Academy of Science and Technology, Kanagawa, Japan. His main fields of interests are nanophotonics and visual optics. He is a member of JSAP and JSKE.