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**Plasmon Enhanced Ultrathin Film Broad-Band Nanoporous Absorber**[1] JIN-YOU LU, Masdar Institute of Science and Technology, DONG LIU, Tsinghua University, KYLE WILKE, MIT, SUMAYA NOORULLA, Masdar Institute of Science and Technology, NICHOLAS FANG, MIT, TIEJUN ZHANG, Masdar Institute of Science and Technology — Ultrathin absorbing films have attracted much attention due to their strong interference persisted inside the lossy dielectric film, which has much smaller thickness compared with conventional resonators. The absorber was realized by coating a lossy dielectric film with tens of nanometers in thickness on a metallic substrate. The ultrathin absorber was further developed to obtain perfect absorption at a given wavelength by inserting a spacer TiO2 between the dielectric and metallic substrate. However, this interference mode just contributes to the narrow band absorption. Here, we propose to combine the strong interference inside the ultrathin film absorber with localized surface plasmons (LSPs) to achieve broad-band absorption. This concept is realized by coating ultrathin absorbing Ge/Au films on nanoporous substrate, where the LSP mode is supported by pore-shape cavities. The near-field optical properties of ultrathin film on nanoporous substrate are analyzed by using the finite difference time domain method to study the spectroscopy and energy flow patterns. Simulation shows the absorption increases with the pore radius until the pore is too large to sustain LSP. Light is trapped in nanopores and penetrated into the lossy dielectric film around the pore entrance.

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