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Infrared Photonic Crystals on the Base of Chalcogenide Glass Inverse Opal. ALI ALIEV, ANVAR ZAKHIDOV, RAY BAUGHMAN, NanoTech Institute, University of Texas at Dallas, Richardson, TX 75083,, ELI YABLONOVITCH, University of California, Electrical Engineering Dept. Los Angeles, CA 90095. — Large surface area infrared photonic crystals with reflectance more than 90% were successfully synthesized by self-assembling large size monodispersed SiO_2 spheres, 0.8 μm - 4.5 μm with following melt infiltration with chalcogenide glass $Ge_{33}As_{12}Se_{55}$ and extraction SiO_2 spheres by chemical etching in 1%HF. The sphere size or the periodicity of the templates are chosen to guarantee the photonic gaps of inverted opals in the region of IR atmospheric transparent windows, 3 - 5 μm and 8 -12 μm. Reflection spectra measured at each step of the fabrication process are in excellent agreement with the modified form of Bragg's law, which takes into account the reduced angle with respect to the normal at which light travels in the opal (i.e. taking into account Snell's law). Fabrication, structural features and the spectral behavior of reflectance peaks of obtained chalcogenide glass inverse opals are presented.

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