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Matching Effect in Superconducting Pb Inverse Opal. ALI ALIEV, SERGEY LEE, ANVAR ZAKHIDOV, RAY BAUGHMAN — The type II superconductivity was observed in highly periodic three-dimensional lead inverse opal prepared by infiltration of a melted Pb in blue (D=160 nm), green (D=220 nm) and red (D=300 nm) opals and following extraction of SiO_2 spheres by chemical etching. The onset of a broad phase transition (ΔT=0.3 K) measured by temperature dependence of magnetic moment and AC resistivity was shifted from T_c=7.196 K for bulk Pb to T_c=7.29 K. Upper critical field H_{c2} (3150 Oe) measured from high-field hysteresis loops exceeds the critical field for bulk lead (803 Oe) four fold. Well distinguished matching affect in field dependence of magnetic moment confirmed by periodic pinning in magneto-resistivity measurements is complying with the lattice parameter of inverse opal structure.

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