Abstract Submitted
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Superconductivity of Mg/MgO interface formed by shock-wave pressure[1] V. AVDONIN, D. SHAKHRAY, Institute of Problems of Chemical Physics RAS, Chernogolovka, A. PALNICHENKO, N. SIDOROV, O. VYASELEV, S. KHASANOV, Institute of Solid State Physics RAS, Chernogolovka — Instability of the non-equilibrium superconducting Mg/MgO-interface under normal conditions has motivated our attempt to create it using shock-wave pressure. During the shock-wave impact, a stroke applied to the sample creates a series of strong high-pressure shock-waves propagating throughout the sample due to relative displacements of local parts of the sample material. Highly non-equilibrium conditions thus realized, can stimulate phase transitions or mechanochemical reactions inaccessible in a static pressure mode. Furthermore, the energy of the shock wave rapidly propagating through the sample within 10^{-6} – 10^{-9} s, leads to local non-equilibrium overheat of the sample's regions at the shock wavefront, followed by their rapid cooling (quenching) as the shock-wave is passed. Such quenching can provide room-temperature stabilization of metastable non-equilibrium phases, unstable otherwise under normal conditions. A mixture of Mg and MgO has been subjected to a shock-wave pressure of $\simeq$20 GPa. The ac susceptibility measurements of the product has revealed a metastable superconductivity with Tc $\approx$ 30 K. Comparison of the ac susceptibility and the dc magnetization measurements infers that the superconductivity arises within the interfacial layer formed between metallic Mg and its oxide due to the shock-wave.

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