Room-temperature superconductivity in compressed polyhydrides

Dmitrii Semenok

Skolkovo Institute of Science and Technology, Moscow, Russian Federation;

dmitrii.semenok@skoltech.ru

The remarkable high-temperature superconducting behavior of H_3S (T_C=200 K, [1]) and LaH_{10} (T_C=250 K [2]) at about 150 GPa catalyzed the search for superconductivity in compressed ternary hydrides. The highest critical temperature of 288 K at 275 GPa has been found recently in the C-S–H system [3]. High-temperature superconductivity in these compounds is due to the formation of metallic hydrogen sublattice, which is obtained by pulsed laser heating of various elements with hydrogen at extremely high pressures achieved during compression on diamond anvils. In this report we will present new results of studies of high-pressure chemistry, magnetic and superconducting properties of YH_6, UH_7, ThH_{10}, $CeH_{9\text{-}10}$, PrH_9, NdH_9, EuH_9 and BaH_{12} binary and $(La,Y)H_{10}$ ternary polyhydrides discovered in the last 2 years by collaboration of IC RAS, LPI, Skoltech and Jilin University (China). Perspectives of design of light and magnetic sensors (SQIUDs) based on superhydrides synthesized in miniature diamond anvil cells will be discussed.

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