Experimental observation of high-temperature superconductivity in H$_2$S at P~150 GPa

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We found that sulfur hydride transforms at P~90 GPa to metal and superconductor with $T_c$ increasing with pressure to 150 K at $\approx$ 200 GPa. Moreover we found superconductivity with $T_c \approx 190$ K in a H2S sample pressurized to $P > 150$ GPa at $T > 220$ K. This superconductivity likely associates with the dissociation of H2S, and formation of SHn ($n > 2$) hydrides. We proved occurrence of superconductivity by the drop of the resistivity at least 50 times lower than the copper resistivity, the decrease of $T_c$ with magnetic field, and the strong isotope shift of $T_c$ in D2S which evidences a major role of phonons in the superconductivity.