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Noble metal electrodes encapsulated in diamond for laboratory tests of high-pressure, high-temperature superconductivity in hydrogen-rich materials ZACHARY GEBALLE, KADEK HEMAWAN, Carnegie Geophysical Lab, RUSSELL HEMLEY, George Washington University — Electrical transport measurements of hydrogen-rich materials at high-pressures (10s to 100s of GPa) are a promising route to experimentally test the many predictions of high-temperature superconductivity in polyhydrides. Major experimental challenges are to electrically isolate leads from the metal part of the gasket, to connect them to a precursor, and to trap hydrogen without shorting or breaking the electrical leads. To achieve all three goals, we combine sputtering of noble-metal electrodes (Pt or Ir) with spot-welding and low-pressure CVD growth of diamond films on the anvil culet. We will present our test results on the contact resistance between noble metal and metallic precursors, and on the hydrogen-trapping ability of these designer diamonds.

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