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Thermoelectric Properties of Hydrogenated Graphene RUWANTHA JAYASINGHA, KASUN FERNANDO, CHRISTOF KEEBAUGH, ROBERT STALLARD, GAMINI SUMANASEKERA, University of Louisville, Louisville, KY 40292 — We have studied the temperature dependence of thermopower (S) and 4-probe resistance (R) of large area Graphene subjected to various degree of hydrogenation. Graphene samples with electrical contacts mounted within a quartz reactor was placed inside a custom made inductively coupled plasma coil and hydrogen gas was introduced to a pressure of ~ 10 Torr. Samples were placed well away from the plasma and both S and R were monitored *in-situ* during the hydrogenation. At desired level of hydrogenation the plasma was turned off and the sample was cooled down to ~ 140 K by lowering the reactor into a liquid nitrogen dewar and both R(T) and S(T) were measured. Both S(T) and R(T) show metal to insulator transition characteristics during the progressive hydrogenation. Both epitaxially grown Graphene on Si-terminated face of SiC and Graphene grown by chemical vapor deposition and transferred on to quartz substrate were studied. The CVD grown sample was found to be p-type under ambient condition but could be tuned to n-type after high temperature annealing at 550 K in a vacuum of 2×10^{-7} Torr. In contrast, epitaxial sample was n-type under ambient conditions. However, the hydrogenation was performed on both samples under degassed conditions.

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