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**SIMPLIFIED MODELS OF GROWTH, DEFECT FORMATION,
AND THERMAL CONDUCTIVITY IN
DIAMOND CHEMICAL VAPOR DEPOSITION**

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ABSTRACT

This report presents a simplified surface reaction mechanism for the Chemical Vapor Deposition (CVD) of diamond thin films. The mechanism also accounts for formation of point defects in the diamond lattice, an alternate, undesirable reaction pathway. Both methyl radicals and atomic carbon are considered as growth precursors. While not rigorous in all its mechanistic details, the mechanism is useful in describing the CVD diamond process over a wide range of reaction conditions. It should find utility in reactor modeling studies, for example in optimizing diamond growth rate while minimizing defect formation. This report also presents a simple model relating the diamond point-defect density to the thermal conductivity of the material.