

Synthesis, Properties and Applications of Nanocrystalline Diamond Films

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Nanocrystalline diamond films are layers comprising several extreme material properties. Because of the large grain boundary volume of this class of diamond films, the properties of grain boundaries are strongly influencing the overall material properties.

The systematic variation of grain sizes by tuning of the growth parameters is a method to optimize the properties of the films for the desired material properties. This way, the electrical conductivity, thermal conductivity, hardness, stiffness and brittleness of the material can be tailored to the needs of the application.

This presentation will give an overview over the synthesis and the mechanical, electrical, thermal properties of nanocrystalline diamond films. Some examples of future and present applications of nanocrystalline diamond films will be shown.