

## **Diamonite-Bonded Composites: Processing, Properties, and Applications**

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A new class of Diamonite-bonded composites (DBC), including particle-, fiber-, network-, and bicontinuous-strengthened forms has been developed. The materials are produced by infiltration of porous structures with carbon nanoparticles (fullerenes), followed by pressure-assisted sintering to transform the infiltrated material into the Diamonite binder phase. Sintering at 1.0 GPa/800°C favors the formation of Diamonite that has hardness comparable to that of SiC, whereas sintering at 0.1 GPa/1000°C favors the formation of Diamonite that has hardness comparable to that of steel. Such an approach affords considerable flexibility in tailoring the properties of DBCs to the performance requirements of various applications, such as aerospace structures, engine components, and protective armor.