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Influence of sintering temperature on the microstructure of diamond-SiC nanocomposites LEVENTE BALOGH, STEPHEN NAUYOKS, WALDEK ZERDA, Department of Physics, TCU, Fort Worth, TX 76129 — Composites with nanosize diamond crystals and nanosize SiC matrix are obtained by sintering ultrasonically mixed nano-diamond and nano-Si powder at 8 GPa and temperatures between 1820 and 2320 °C. The eCMWP (Extended Convolutional Multiple Whole Profile) fitting method is applied to the X-ray diffractograms of the sintered samples to determine the parameters of the microstructure. Crystallite size distribution, dislocation and twin density are determined and discussed. As sintering temperature increases crystallite size increases and defect densities decrease slightly in both phases. At sintering temperatures higher than 2000 °C the microstructure of SiC shows a substantial change compared to lower sintering temperatures, crystallite size increases, dislocation and twin density decreases dramatically. Porosity measurements are also performed in order to see the relationship of these measured results with the microstructure of composites.

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