

## Carbon-rich Nano-structured Boron Carbide by Mechanical Alloying

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### Abstract

The aim of this work is to fabricate carbon-rich nanostructured B<sub>4</sub>C by mechanical alloying using a high energy ball mill (Simoloyer® CM01-2lm). Powder mixtures of boron carbide with carbon and titanium carbide were mechanically alloyed and the process parameters optimized. After a milling time of 2h the grain-size of B<sub>4</sub>C and TiC mixture could be reduced significantly down to <3,5Å. The particle sizes of the processed powder were measured by laser-diffraction and was observed to be in the range of 1µm. The evidence of the reduction of the crystallite size was provided by XRD peak broadening and additional analyses by microscopy (SEM, light microscopy) and particle size measurements provided information about the powder morphology and structure. The mechanically alloyed powders were consolidated using pressureless sintering and microwave sintering.

Materials-characteristics will be given by SEM, XRD, TEM, laser diffraction, Tap-densimetry and chemical analysis.