Reaction of Hexagonal Boron Nitride Nano-crystals under Mild Hydrothermal Conditions

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\textit{Dedicated to Professor Gérard Demazeau on the occasion of his 65\textsuperscript{th} birthday}

The reaction between hexagonal boron nitride (hBN) nano-crystals and water at low temperature and low pressure has been investigated. The results reveal that this reaction can be greatly promoted by increasing the hot-pressing temperature. However, when the temperature is above 280 °C, the reaction is too fast to be controlled by varying the hot-pressing pressure and time. On the other hand, stress and defects are induced in hBN nano-crystals by the hydrothermal hot-pressing process, resulting in a shift of the IR absorption bands and a deterioration of crystalline perfection. These results may be useful for synthesizing cBN by the hydrothermal method and converting hBN nano-crystals into cBN under moderate conditions.

\textit{Key words:} Hexagonal Boron Nitride, Hydrothermal Hot-press, Stress, Crystalline Perfection