

Single-crystal diamond pyramids formation by hot filament chemical vapor deposition

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Chemical vapor deposition (CVD) allows fabrication of different types of thin film carbon materials. Recently it was demonstrated in our works that combination of CVD and selective oxidation might be used for synthesis single-crystal diamond crystallites with numerous attractive characteristics [1-3]. Plasma enhanced CVD has been used in these previous studies, which limits capacity of its productivity.

In this study we demonstrate possibility of production of similar polycrystalline films and single crystal diamonds by using hot filament CVD (HFCVD). Usage in this work industrial HF CVD system “SP3 Diamond Technologies Inc.” potentially allows fabrication of large area polycrystalline films with total surface area of about 0.5 m². Obtained results confirm ability of used HFCVD method to provide synthesis of polycrystalline diamond films with characteristics allowing obtaining single crystal diamonds using selective oxidation. SEM images presented in Fig. 1 demonstrate the diamond crystallites obtained by HF CVD. The analysis of the methodology will be presented in this report.

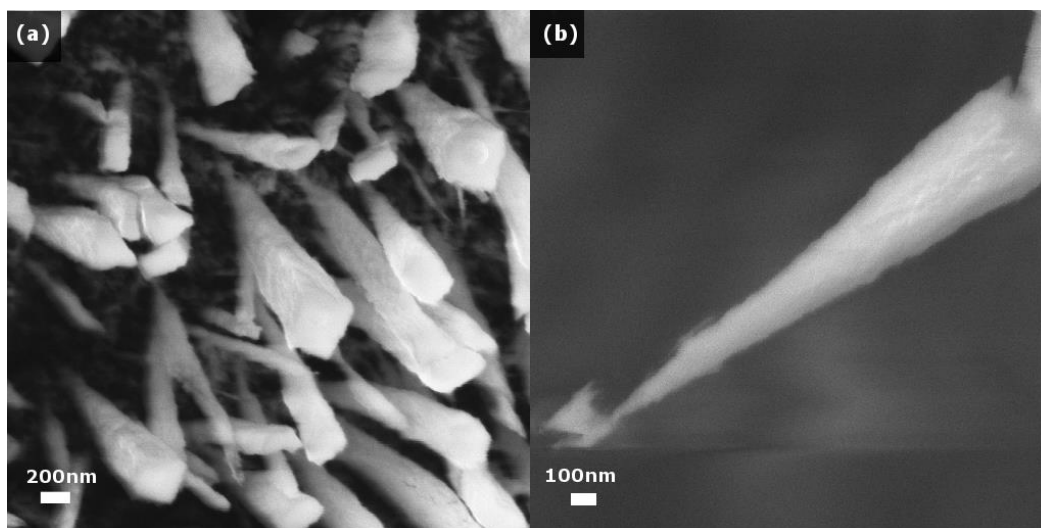


Fig. 1. (a,b) – typical SEM images of the diamond needles, which were obtained by selective oxidation of polycrystalline films produced using industrial HFCVD reactor

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