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Short Communication

Ultrafast Catalytic Synthesis of Carbon Nanofibers on a Surface of Commercial Chlorinated Polymers under the Action of a High Power Ion Beam of Nano-second Duration

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Ultrafast Catalytic Synthesis of Carbon Nanofibers on a Surface of Commercial Chlorinated Polymers under the Action of a High Power Ion Beam of Nanosecond

Duration

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Highlights

Some commercial chlorinated polymers can be transformed into carbon nanofibers by high power ion beam irradiation.

Two types of carbon nanofibers have been synthesized - continuous and “bamboo-like” nanofibers.

CNFs growth rate is 10^7 times higher than known methods.

The influence of dehydrochlorination of the polymer on synthesis of carbon nanofibers was investigated.

Abstract: Carbon nanofibers (CNFs) have been rapidly synthesized on the surface of low-cost commercial chlorinated polymers (chlorinated polyvinyl chloride, polyvinyl chloride), which contains iron compounds, under the action of a high power ion beam at room temperature. Organic ($\text{Fe}(\text{C}_5\text{H}_5)_2$) and inorganic ($\text{FeCl}_3 \cdot 6\text{H}_2\text{O}$ и $\text{Fe}(\text{NO}_3)_3 \cdot 9\text{H}_2\text{O}$) iron compounds were used as catalytic additions. SEM, TEM and Raman spectroscopy were used to investigate the morphologies and structure of irradiated polymers. CNFs had a most probable diameter in the

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