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Synthesis of magnetic CNTs for cancer treatment

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There exist more than one hundred different types of cancer and therefore no particular treatment is offered to people struggling with this disease. There is one promising cancer modality-hyperthermia therapy which is based on exposing body tissues to high temperatures. Carbon nanotubes properties make them safer in use in medicine and hyperthermy than many other substances. Presently method widely used for carbon nanotubes synthesis is the CVD (chemical vapor deposition). It involves the pyrolysis of substances, which contain carbon. The ferromagnetic material located inside the carbon nanotubes may cause heating of them. To do this it is necessary to place the nanotubes in the electromagnetic field. If the carbon nanotube will be connected to a cancer cell can be effectively eliminated. In this paper the CVD furnace with 3 temperature controlled zones for carbon nanotubes filled with iron was described. In the first zone the liquid solution of catalyst and gas mixture ($Ar+H_2$) was supplied. The last one was for deposition of carbon nanotubes on silicon wafer. Thanks to characterization of CNTs, it can be stated that the best conditions for synthesis of CNTs are following: infusion speed of catalyst solution should be set between 8.5 ml/h and about 9 ml/h; gas flow should be fixed at 0.8 l/min for hydrogen and 0.5 l/min for argon during process of synthesis. Temperature of the first zone should be about 600 K and that of the other zones should be 1100 K.

Biography

Lukasz Szymanski has obtained his PhD degree in 2005 and became Professor in 2016. In 2015, he has published book entitled "*Electro-synthesis of Carbon Nanotubes at Atmospheric Pressure*". He has presented research in the field of synthesis of carbon nanotubes using plasma. His researches are related to the topic of thermal methods of waste utilization and synthesis of carbon nanotubes in thermal processes-mainly in reactors using resistive heating and microwave plasma. He is the author or co-author of more than 70 publications and participated in several research projects. He is also a Member of the Low-Temperature Plasma Chemistry Commission.

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