Carbon structures produced as a result of periodically repeated spark discharge in liquid hydrocarbons

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High voltage periodical feed between electrodes dipped in a liquid (in our case hydrocarbons) leads to liquid evaporation and decomposition in the discharge zone. As liquids do not shrink and they are inert the expanding liquid vapor meets the resistance of the ambient and the pressure inside it grows. The obtained decomposition components are affected by the intensive electric field between the electrodes and the big temperature gradient oriented radial to the plasma cord for a short time interval as long as gaseous phase occurs. The high energy components get at decomposition and their oriented in the same direction movement set premises for their secondary combination in different versions and the new structure type origin. Feeding voltage periodical break restores the liquid starting condition and thus the arising structure growth is stopped. As a result they remain of small dimensions.

In the present work carbon nanostructures (nanocones, nanotubes, nanohorns, hollow spheres, nanobelts and alike, for instance) are described produced by spark discharge in a dispersed medium of xylene and water and xylene, water and ferrocene. The particles have been registered at TEM observations.