Review of “Helical microtubules of graphitic carbon”

This paper is novel because a new type of carbon structure was presented and it was seen that engineering of carbon structures could be possible.

Summary

The aim of this study was to investigate a new type carbon structure. For production, arc discharge evaporation, graphite, and argon-filled vessel was used. For observation, transmission electron microscopy (TEM) and electron diffraction patterns were used.

Needle-like tubes, varying diameter from 4 to 30 nm and up to 1 µm in length, were observed at negative end of the electrode. Graphite sheets were seen in coaxial formation and seamless, with changing number of rolled sheets from 2 to 50. It was also seen that there were other structures. It meant needles are not pure. After production of needle-like tubes, study continued with trying to explain how those needles grown up from graphite sheets. Rolling orientations were discussed, also it was mentioned that it could be like scrolling from single carbon-hexagon.

Finally, Iijima could not give exact explanation of how the coaxial tubes were formed. However, at the end he pointed a possible way for growth mechanism [1].

Pros & Cons

This paper has an unexplained inadequate part; after explanation of why C_{60} has less bond energy than graphite, it was said this fact might been used. However, it wasn’t used. Also explanation part with miller indices is complicated, hard to understand. One more thing would be necessary: what kind of properties this structure have. At least some predictions about structure could be done despite of not being at pure condition.

This paper is respectable because a new carbon structure was produced and was proved by TEM. Moreover, it was a good introduction for the issue of growth process.

References