Nanomaterials

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Properties of nanocarbon tubes

Table 1: Properties of carbon allotropes and other materials

Material	Young's Modulus (GPa)	Tensile Strength (GPa)	Density (g/cm^3)
Single-wall nanotube	800	> 30	1.8
Multi-wall nanotube	800	> 30	2.6
Diamond	1 140	> 20	3.52
Graphite	8	0.2	2.25
Steel	208	0.4	7.8
Wood	16	0.008	0.6

Electrical and thermal properties

In terms of thermal properties, carbon nanotubes **dissipate heat** better than any other known material and are **excellent thermal conductors**.

Chemical reactivity

Carbon nanotubes are very stable: they can withstand the attack of numerous chemicals and resist exposure to a large temperature range. However, their chemical structure can be changed by the addition of specific ligands with functional groups that allow interaction with different chemicals. This allows them to be used in **sensors**.

Synthesis of CNT

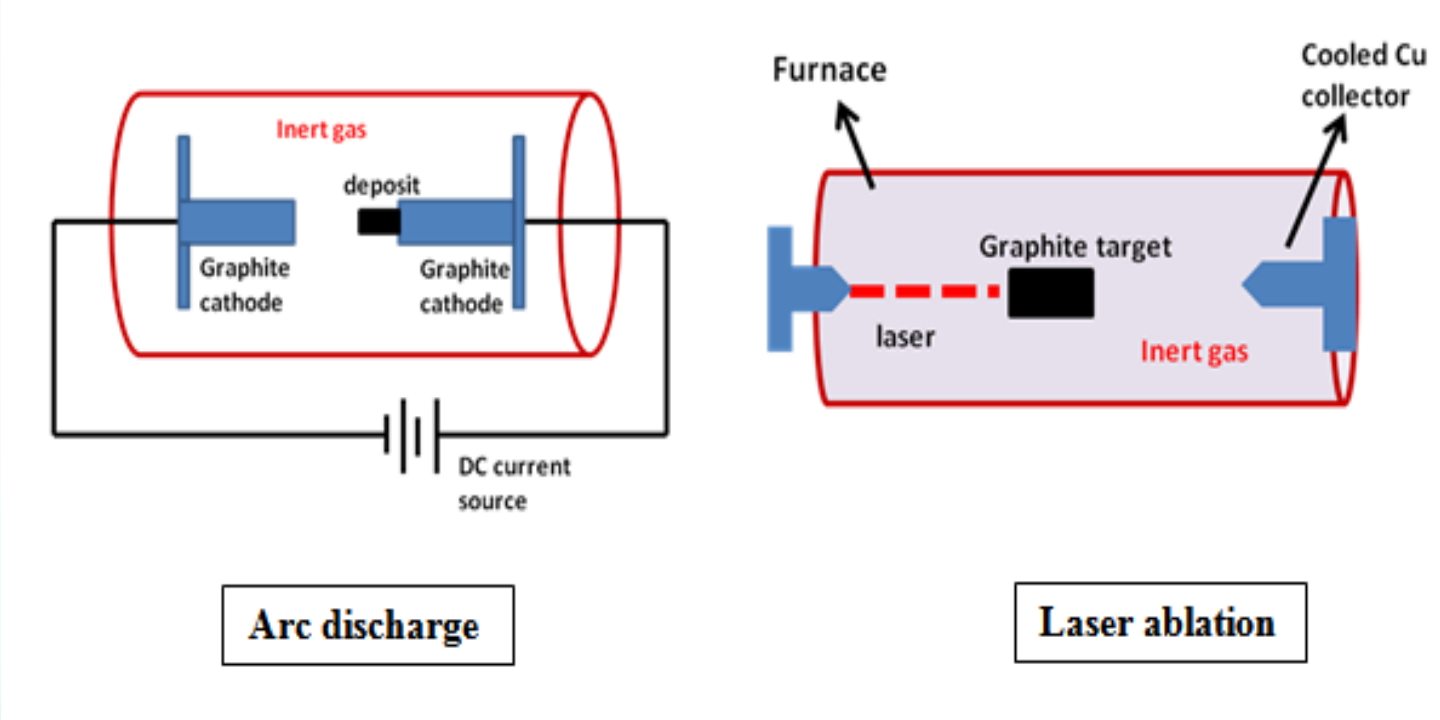

Fig. 12. Schematics for CNT formation by sublimation of graphite with subsequent desublimation.

Decomposition of carbon containing compounds

$$Hydrocarbon + Fe / Co / Ni\ catalysts \xrightarrow{550\text{–}1000^{0}C} CNT$$

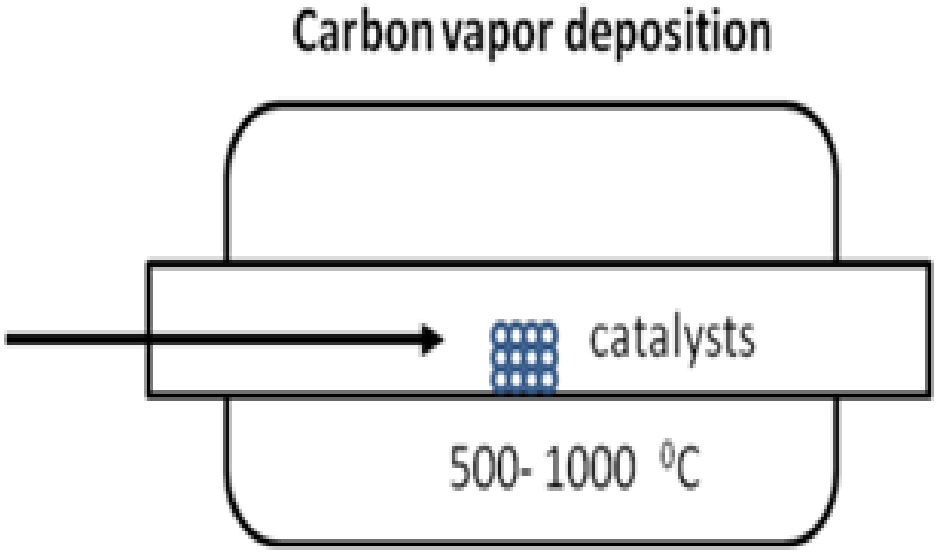

Fig. 13 . Schematics for carbon vapor deposition method