

Free-standing, highly aligned and transparent sheets of Silicon Oxide and Silicon Nitride Nanotubes

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Abstract.

We report a new method to synthesize high aspect ratio, aligned and free-standing silicon oxide and silicon nitride nanotubes by using carbon nanotubes as templates. The ceramic phases are deposited as films on the CNTs by low temperature (250°C) plasma-enhanced chemical vapor deposition. The nanotubes can be removed from the interior of the ceramic nanotubes by oxidation. Transparent, free-standing sheets of ceramic nanotubes can be easily produced (Fig 1 and 2). The ceramic nanotubes have an internal diameter of approximately 10nm and outer diameter between 15 to 100nm. When in high temperature (1050°C) the silicon nitride NT showed a higher stability in high temperature than the silicon oxide ones. The ceramic nanotubes show a hydrophilic behavior and can be easily suspended in water without use of surfactants.

