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## 5. Role of aluminum oxide support layer in growth of carbon nanotubes by plasma-enhanced chemical vapor deposition

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**Abstract.** Catalytic nanoparticle size and support layer thickness are crucial for control of the diameter of carbon nanotubes (CNTs). We used plasma-enhanced chemical vapor deposition and triple-layered Al<sub>2</sub>O<sub>3</sub>/Fe/Al<sub>2</sub>O<sub>3</sub> (support/catalyst/support) thin films with different film thicknesses to investigate the growth of vertically aligned CNTs. A thinner Fe catalyst layer or thicker Al<sub>2</sub>O<sub>3</sub> underlayer aided growth of single-walled CNTs on thin films with Al<sub>2</sub>O<sub>3</sub>/Fe/Al<sub>2</sub>O<sub>3</sub> thicknesses of 1/0.2/1, 1/1/80, and 1/1/100 nm. The Al<sub>2</sub>O<sub>3</sub> underlayer became thinner during CNT growth.

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