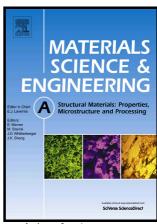
## Author's Accepted Manuscript

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### **ACCEPTED MANUSCRIPT**

Effectively reinforced load transfer and fracture elongation by forming Al<sub>4</sub>C<sub>3</sub> for in-situ synthesizing carbon nanotube reinforced Al matrix composites

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#### **Abstract:**

This work presents an *in-situ* chemical vapor deposition (CVD) method to synthesis carbon nanotube (CNT) on Al powders in a vertical tube furnace. The carbon nanotube reinforced Al matrix composites (CNT/Al composites) were fabricated by a new powder metallurgy (PM) approach associated with vacuum induction melting technique. It was shown that CNT was homogenously distributed in the Al matrix, and an interfacial transiting layer of Al<sub>4</sub>C<sub>3</sub> was formed between Al matrix and CNT in the bulk material. The tensile test showed that 1.5 vol % CNT/Al composites exhibited the largest tensile strength of 191 MPa as well as an excellent elongation of 32.6 %. The strengthening efficiency of the 1.5 vol % CNT/Al composites improved by ~ 80 % compared to the unreinforced pure Al. The strengthening mechanisms were mainly attributed to the load transfer of CNT, Al<sub>4</sub>C<sub>3</sub> and dislocation strengthening. The Al<sub>4</sub>C<sub>3</sub> transiting layer was beneficial

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