



**The Chinese University of Hong Kong**  
**Non-confidential Abstract of Technology Disclosure**

---

**Title:**

Aluminum Metal Matrix Composite Materials Reinforced by Intermetallic Compounds and Alumina Whiskers

**CUHK Ref. No.:**

96/SCI/011

**Inventor:**

Professor Dickon H L NG and Dr Cai-Dong QIN  
Department of Physics

**Patent Status:**

- ◆ US Patent no. 5,972,523
- ◆ US Patent no. 6,187,260

**Non-confidential abstract:**

A process for making composite materials, namely reinforced Al-metal matrix composites based on either: (I) Al-W intermetallic phase and Al<sub>2</sub>O<sub>3</sub> ceramic whiskers, or (II) Al-Mo intermetallic phase and Al<sub>2</sub>O<sub>3</sub> ceramic whiskers. This process involves the oxidation of aluminum using tungsten oxide in powder form for product I, and that of aluminum and molybdenum oxide in powder form for product II. Product I contains an Al-W intermetallic phase, some sapphire whiskers, and a continuous Al-metal matrix. Product II contains an Al-Mo intermetallic phase, sapphire whiskers, and a continuous Al-Mo intermetallic phase, sapphire whiskers, and a continuous Al-metal matrix. The alumina whiskers are formed as a result of two reactions. They are: (i) the oxidation between the pre-mixed Al and the oxide, and (ii) the oxidation of Al with the atmospheric environment in the presence of the oxide, which acts as a catalytic agent for the reaction. These newly invented products are hard, strong and light. They are fabricated at above the melting point of aluminum, typically above 800°C. and preferably around 1000°C., and no sophisticated facility is required in the production process. Based on the above powder mixtures of I, or II, additional powders, for example, carbon (C), silicon dioxide (SO<sub>2</sub>) or other metal oxides, can be mixed to further improve the structural properties of the composites.

---

**For further queries, please contact:**

Mr Billy Lam  
Technology Licensing Coordinator  
*Tel:* (852) 2609 8882  
*Fax:* (852) 2603 5451  
*Email:* [billylam@cuhk.edu.hk](mailto:billylam@cuhk.edu.hk)

*Address:*  
Technology Licensing Office  
The Chinese University of Hong Kong  
Room 226, Pi Ch'iu Bldg, Shatin, New Territories  
Hong Kong SAR