

Title (en)
CVD GROWN TRANSITION METAL CARBIDE AND NITRIDE WHISKERS

Publication
EP 0472666 A4 19950329 (EN)

Application
EP 90911429 A 19900329

Priority
US 35464189 A 19890519

Abstract (en)
[origin: WO9014451A1] A chemical vapor deposition process for producing single crystal whiskers of metal carbides, nitrides, or carbonitrides is provided. The process includes flushing a reactor having a suitable growth substrate surface heated to 1120 to 1225 degrees C and flowing reactant gases past the growth substrate to form whiskers. The reactant gases comprise a metal halide and one or more of nitrogen and methane. The atomic ratio of carbon and nitrogen to metal is about 0.7:1 and 20:1, respectively. The volume ratio of hydrocarbon and nitrogen to hydrogen is about 1:37 and 1:1.6, respectively. The preferred growth substrate materials are nickel powder dispersed onto alumina oxide plates or nickel electrolytically deposited onto TiC or TiN coated aluminum oxide plates. The whiskers may be subjected to a post-growth treatment to remove the residual nickel catalyst used to grow the whiskers. The process is a two-step procedure. In the first step, the whiskers are treated at between 350 to 400 degrees C at one atmosphere pressure with 2.8 slm of HCl in 11.4 slm of argon gas for approximately one hour to convert the nickel residual catalyst to NiCl₂. In the second step, the whiskers are then heated to 1000 degrees C and treated with 11.4 slm of argon for one hour to cause the NiCl₂ to sublime. This results in the reduction of the residual nickel content of the whiskers from 1-2 wt % to 0.2 wt %, an order of magnitude reduction, without adversely affecting the physical properties of the whiskers.

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Citation (search report)
• [PX] US 4900525 A 19900213 - D ANGELO CHARLES [US], et al
• [A] PATENT ABSTRACTS OF JAPAN vol. 11, no. 136 (C - 419)<2583> 30 April 1987 (1987-04-30)
• See references of WO 9014451A1

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