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Laser Irradiation Pretreatment Effects on Catalyst-Coated Silicon and Subsequent CVD Nanotube Growth[1] C.M. ROULEAU, G. ERES, H. CUI, D.B. GEOHEGAN, Condensed Matter Sciences Div., Oak Ridge National Laboratory, I.N. IVANOV, A.A. PURETZKY, Dept. of Mat. Sci. and Engr., Univ. of Tennessee — Developing methods for directed growth of nanotube arrays is important for many nanotube-based applications. Although we are currently growing mm-lengths of vertically-aligned nanotube arrays (VANTAs) from e-beam evaporated catalyst films, further enhancement of length, rate, and density are desired. One promising approach is catalyst modification using laser irradiation. Results are presented on the effects of pulsed KrF laser irradiation prior to chemical vapor deposition of VANTAs. Under typical conditions, a single laser shot was directed at a catalyst coated Si wafer to produce a well-defined laser affected zone. Fluences that ranged from 0.5 to 1.5 J/cm^2 were employed. In-situ videography was used to study VANTA growth rate in, and adjacent to, the laser affected zone. Atomic force microscopy was used to characterize catalyst surfaces prior to, and following, laser irradiation. The results show that the growth rates for VANTAs within the affected region improved remarkably. The efficacy of this technique in producing changes in VANTA length are shown.

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