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**Photo-catalytic studies of transition metal doped titanium dioxide thin films processed by metalorganic decomposition (MOD) method**

P. TALAGALA, X. MARKO, K.R. PADMANABHAN, R. NAIK, Wayne State University, Detroit MI, D. RODAK, Y.T. CHENG, General Motors R&D Center, Warren MI — We have synthesized pure and transition element (Fe, Co and V) doped Titanium oxide thin films of thickness  $\sim 350$  nm on sapphire, Si, and stainless steel substrates by Metalorganic Decomposition (MOD) method. The films were subsequently annealed at appropriate temperatures (500-750C) to obtain either anatase or the rutile phase of  $\text{TiO}_2$ . Analysis of the composition of the films were performed by energy dispersive X-ray(EDAX) and Rutherford backscattering spectrometry(RBS). Ion channeling was used to identify possible epitaxial growth of the films on sapphire. Both XRD and Raman spectra of the films exhibit that the films annealed at 550C are of anatase phase, while those annealed at 700C seem to prefer a rutile structure. The water contact angle measurements of the films before and after photoactivation, demonstrate a significant reduction in the contact angle for the anatase phase. However, the variation in contact angle was observed for films exposed to UV ( $<10^\circ$ - $30^\circ$ ) and dark ( $25^\circ$ - $50^\circ$ ). Films doped with Fe show a trend towards lower contact angle than those doped with Co. Results with films doped with V will also be included.

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