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A novel technique for coating fine particulates with functional films by magnetron sputtering

Peter Kelly, Marina Ratova, Glen West, David Sawtell, May Azzawi, Asima Farooq

Manchester Metropolitan University, Manchester, United Kingdom

peter.kelly@mmu.ac.uk

Magnetron sputtering is a well-established technique for the deposition of high quality metallic and ceramic coatings onto a wide range of substrate materials and forms. However, it is not generally suitable for the coating of fine particulates (particle sizes from 100s of nm to 100s of microns). This paper describes a new technique for depositing uniform coatings of functional films onto a range of particle types and sizes. The films were deposited by reactive and non-reactive pulsed magnetron sputtering and to provide uniform coverage the particles were oscillated in a bowl positioned underneath the magnetron. Coatings of Ti, TiO₂, Sn and SnO₂ were deposited from a single magnetron source and Bi/W oxides were co-deposited from a dual source. The characterisation of the coated particles by SEM, TEM and EDX described here, and other techniques relevant to their targeted applications, demonstrates the potential of this system. For example, enhanced visible light activity was observed for PC500 particles coated with bismuth tungstate, compared to the uncoated powder.

Keywords

magnetron sputtering

functional films

powders