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Chair	Ozan Özer

Better “Understanding of the Vacuum” to Improve Film Quality and Process Control

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Biography

Dr. Dermot Monaghan is the managing director of Gencoa Ltd which he founded in 1994. He completed his first degree in Engineering Metallurgy in 1988 at the University of Salford, UK and
his PhD in 1992 in ‘the use of unbalanced magnetron sputtering for the formation of novel PVD films’ also at Salford University.
In 1993 Dermot was awarded the C.R.Burch Prize from the British Vacuum Council for ‘outstanding research in the field of Vacuum Science and Technology’ by a young scientist.
Dermot is the Past Chairman of the UK, Institute of Physics, Thin Film and Surfaces group and is a former UK representative for Thin Film Technology for the International Union for Vacuum Science and Technology (IUVSTA).
Dermot’s main area of activity relates to vacuum plasma deposition and the development of advanced plasma and sputter deposition devices and associated process sensing and feedback control products. Such devices are used to create thin film structures on surfaces used in products including touch screens, solar cells, microelectronics, hydrogen fuel cells, batteries and biocidal surface protection.

Abstract

A wide range of glass is coated and processed in a vacuum environment. The nature of a vacuum is inherently problematic especially when enacted on a very large scale. There is no such thing as a ‘leak’ or contamination free vacuum chamber, just the levels and the effect on production quality and speed. The standard approach to assessing the vacuum quality is the pressure reading and helium leak checking. To a lesser extent, analysis of the trace gases in the vacuum is used to provide more definitive analysis. Gas analysis is a powerful tool as it provides a total picture of species present, and this can be used to track production quality and unwanted variations. It can provide on-line chamber atmospheric leak rates, leak rates of chamber components, substrate and chamber moisture outgassing rates, as well as the quality and ratio of process gases. All this information can be used to good effect to improve product quality and productivity as well for AI based optimisation. The method of remote plasma optical emission spectroscopy (RPOES) has been shown as a very important tool to track gas species in an industrial vacuum environment as it combines sensitivity with robustness.