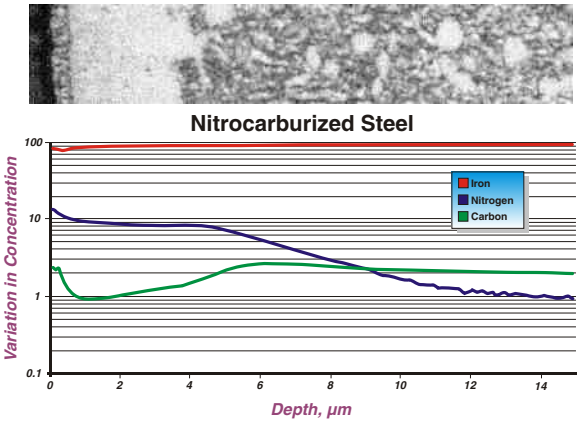
Spectroscopy Application Note

Depth Profile Analysis for Surface Product Quality Control

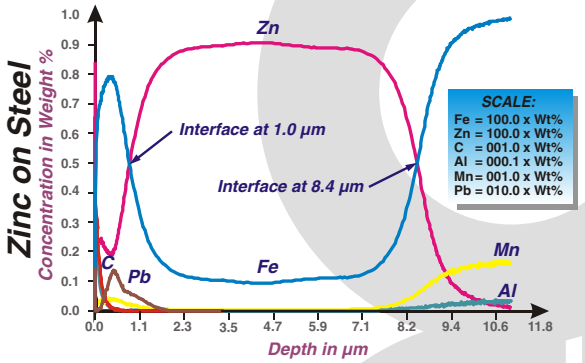
Glow discharge spectroscopy (GDS), as an atomic emission technique, is used for both bulk and quantitative depth profiling analyses. GDS allows sampling of the surface a few nanometers at a time; therefore, the correlation between a material's chemistry and depth becomes readily apparent. Simultaneous data on multiple elements, in different matrices, is provided in an easy-to use WindowsTM-based environment. The layer-by-layer removal of sample material allows for the quantification of results in many sample types, both homogenous and non-homogenous.

The versatility of GDS allows both routine and non-routine applications, making GDS a practical tool for production control and problem solving applications.

Variation of carbon and nitrogen concentration vs depth in a nitrocarburized steel surface.



Quantitative plot shows depth and concentrations for coated materials.



Conductive Materials

(a) Electroplated steels - coating thickness, coating weight and compositional uniformity
(b) Decarburization - profiling of unprepared surface to determine carbon concentration vs depth
(c) Nitrocarburized steels - thickness and composition of heat treated zone
(d) PVD coatings (TiN, TiCN, CrN, etc.) - thickness, composition and residual oxide/carbon contamination
(e) Steel in process (i.e. Zn phosphate) - thickness and composition
(f) Semiconductors - profile material layers and composition

Nonconductive Materials

(a) Thermal barrier coatings - coating thickness and composition
(b) Polymer coatings - profile coating to ensure metal is not diffusing through polymer
(c) Glass - distribution of diffused elements
(d) Paint on steel - profile coating

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