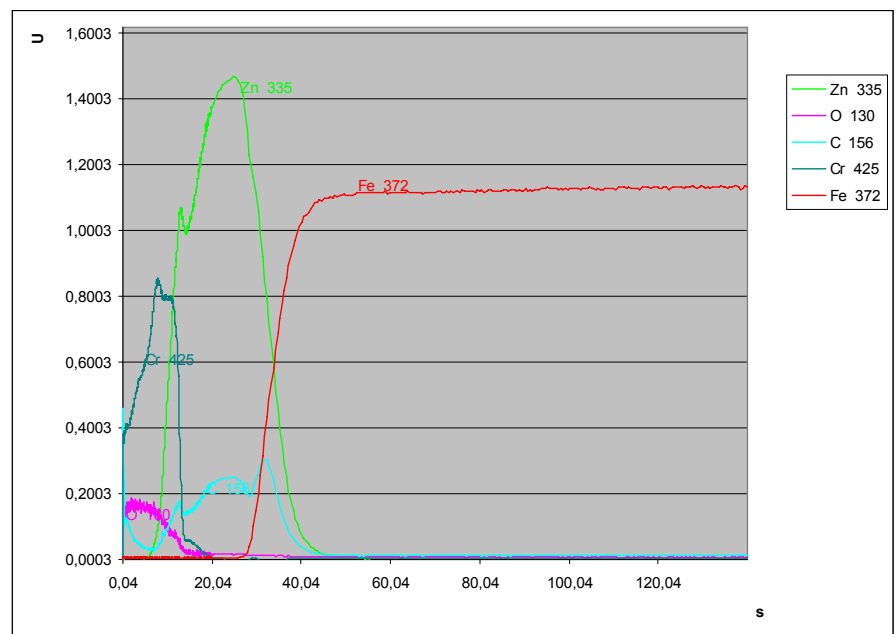


Speciation of Cr in GD

Chromium oxides are a powerful means for passivation or pre-treatment of commercial metal surfaces, such as galvanized steel. The treatment forms a thin layer of mixed Cr^{3+} and Cr^{6+} oxides on the metal surface. The Cr^{3+} oxide acts as a barrier film

and the Cr^{6+} oxide as a sacrificial film. Unfortunately the sacrificial nature of Cr^{6+} makes it a health risk to humans and so its level must be carefully controlled. It is therefore not sufficient to measure the total amount of Cr on the surface, it is also necessary to know the Cr^{6+} to Cr^{3+}

Analysis of a chromated sample



The current norms tolerate a minimum level of Cr^{6+} and the plans are to ban completely the Cr^{6+} from all treatments.

Cr^{6+} is predominantly $\text{CrO}_3 + \text{CrOOH}$ while Cr^{3+} is Cr_2O_3 . The atomic ratio of O/Cr is therefore 2.5 in Cr^{6+} and 1.5 in Cr^{3+} .

Since GD-OES is capable of measuring O/Cr atomic ratios, GD-OES can therefore be used to estimate Cr^{6+} to Cr^{3+} ratios on surfaces and is a quick way to estimate if Cr^{6+} is present or not.

Key points: though giving atomic information GD can help on molecular or speciation issues.