

Application Bulletin



Of interest for:
General analytical laboratories

No. 30/1 e

Photometric determination of Cr(VI)

Summary	<p>With chromates and dichromates, diphenylcarbazide gives a red-violet coloration which can be measured with the 662 Photometer. The reaction is extremely sensitive, enabling concentrations of $\rho(\text{Cr}) < 0.1 \text{ mg/L}$ to be measured without difficulty.</p> <p>In electroplating effluents, chromium occurs as the Cr(VI) ion. It must first be reduced to Cr(III) and then precipitated as the hydroxide. With incomplete reduction, hexavalent chromium remains in solution in the effluent water. For this reason, periodic checks for chromium in the effluent are necessary.</p>
Apparatus	<ul style="list-style-type: none">▶ 2.662.0010 Photometer▶ 6.1108.010 Light guide
Reagents	<ul style="list-style-type: none">▶ Reagent solution: Dissolve 4 g phthalic anhydride (AR grade) and 0.25 g diphenylcarbazide (AR grade) in ethyl alcohol (AR grade), and make up to 100 mL.▶ Sulphuric acid: $w = 0.96$ (96%) AR grade
Method	<p>Take 50 mL of neutral sample solution and add 0.2 mL sulphuric acid. After mixing, add 2 mL of the reagent solution and again mix thoroughly. Then measure the extinction at a wave-length of $\lambda = 540 \text{ nm}$.</p> <p>Blank control: water.</p>
Calculation	<p>The results are evaluated by means of calibration curves.</p>
Disturbing influences	<p>Fe(III) ions give a coloration in the presence of chloride or sulphate. A large number of other coloured ions can vitiate the results: Co(II), Cu(II), Ni(II), U(VI). The effect of coloured ions can be eliminated by means of the blank control. Ce(IV) will oxidise Cr(III) to Cr(VI).</p>

Photometric determination of Cr(VI)**Example****Calibration curve**Determination of Cr^{6+} at $\lambda = 540 \text{ nm}$ 