Ti Application Note No. T- 24

Title:	**Metal contents of alkaline plating baths for cadmium, copper, lead or zinc**

***Summary*:**	Determination of cadmium, copper, lead and zinc in alkaline plating baths by potentiometric titration with EDTA using the Cu ISE.

Sample:	Alkaline plating bath for cadmium, copper, lead or zinc

Sample Preparation:	Work has to be performed in the fume hood!!! Pipette 5.00 mL sample into a Kjeldahl flask. Add 10 mL dist. water and then carefully conc. HNO_3 in excess until the mixture is strongly acidic. Boil to dissolve and to remove cyanide completely. Allow the solution to cool, rinse it into a 50 mL volumetric flask with dist. water, fill the flask to the mark and mix the contents.

Instruments and Accessories:	702, 716 or 736 Titrino or 726 Titroprocessor, 6.0502.140 Cu ISE and 6.0726.100 reference electrode

Analysis:	**Determination of Cd and Zn:** Pipette a defined volume of the prepared sample solution into a beaker and dilute with dist. water to ca. 40 mL. Add 5 mL NH_3/NH_4Cl buffer pH = 10 (1 mol/L NH_3 + 1 mol/L NH_4Cl) and 1 mL CuEDTA. Stir for 1 min and titrate with c(EDTA) = 0.1 mol/L using the MET mode. **Determination of Cu:** The same as for Cd and Zn, but without addition of CuEDTA. **Determination of Pb:** The same as for Cd and Zn, but instead of NH_3/NH_4Cl buffer pH = 10 add 5 mL acetate buffer pH = 4.6 (0.5 mol/L acetic acid + 0.5 mol/L Na acetate).

Calculation:	1 mL c(EDTA) = 0.1 mol/L corresponds to	11.241 mg Cd^{2+} 6.3546 mg Cu^{2+} 20.72 mg Pb^{2+} 6.538 mg Zn^{2+}

Calculation:	g/L metal = EP1 * C01 / C00 EP1 = titrant consumption in mL C00 = mL of original sample contained in the sample volume used for the titration C01 = 11.241 or 6.3546 or 20.72 or 6.538 (Cd^{2+} or Cu^{2+} or Pb^{2+} or Zn^{2+} equivalent in mg/mL, see above)

Remarks:	If the analysis is performed at only one pH value it is not possible to determine the different metals in a mixture as only the sum of the metals is determined.