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The Application of 1-(5-Benzylthiazol-2-yl)azonaphthalen-2-ol in Extraction-Photometric Analysis of the Main Soils Pollutants Content (Copper, Zinc, Cadmium and Lead)

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The possibility of the extraction-photometric determination of Cu(II), Cd(II), Pb(II) and Zn(II) with a new organic reagent 1-(benzylthiazol-2-yl)azonaphthalen-2-ol (BnTAN) was investigated. The reagent creates chelate complex compounds with Cu(II), Cd(II) and Zn(II) ions (ε_{590}(Cu(II)) ≈ $2.2 \cdot 10^4$ L·mol^{-1}·cm^{-1}, ε_{595}(Cd(II)) ≈ $1.9 \cdot 10^4$ L·mol^{-1}·cm^{-1}, ε_{600}(Zn(II)) ≈ $2.1 \cdot 10^4$ L·mol^{-1}·cm^{-1}). Optimal conditions for the extraction of Cu(II), Cd(II) and Zn(II) complexes into carbon tetrachloride were found. By means of the mole-ratio method and the method of continuous variations it was established that two molecules of BnTAN and one ion of the transition metal take part in the creation of the complex compound. Sensitive methods (C_{min} ~ $2.0 \cdot 10^{-6}$ mol·L^{-1}) of Cu(II), Cd(II) and Zn(II) extractive-photometric determination were developed. The possibility of the consequent extraction-photometric determination of each metal was shown. Methods was tested on model solutions and applied for the determination of transition metals in alloys and soils.

Keywords: spectrophotometry, extraction, cooper, cadmium, zinc, thiazolylazonaphthol dyes