A new method of preconcentration of copper, zinc, iron and nickel in traces from aquatic matrix was investigated. The colloid bulky hydrated chromium(III) oxide, Cr₂O₃·xH₂O and chromium(III) pentamethylenedithiocarbamate, Cr(PMDTC)₃, were used as a selective collectors for flotation of trace elements. All important parameters necessary for the successful flotation were determined: pH of the medium, mass of cobalt, amount of used dithiocarbamate, type of surfactant etc. Heavy metals present in water were incorporated simultaneously into the collector mass at pH 7.5 by addition of 20 mg of Cr(III) and 0.4 mmol of pentamethyleneammonium pentamethylenedithiocarbamate, PMA-PMDTC, to 0.5 L water sample. A solid precipitate was separated from the processed water phase by tiny air bubbles. After dissolving with strong acid, the solution is tested by flame or electrothermal atomic absorption spectrometry (ETAAS). The ETAAS limit of detection for Cu by proposed method is 0.01 µg L⁻¹, 0.15 µg L⁻¹ for Zn, 0.02 µg L⁻¹ for Fe, and 0.02 µg L⁻¹ for Ni. The precision of the method is expressed as relative standard deviations (6.95% for Cu, 2.31% for Zn, 5.5% for Fe, and 5.29% for Ni). The method was validated by the method of standard additions and by its application to the reference materials (Surface water-SPS-SW-1, River Thames Water-LGC-6019). The applicability of the method proposed was confirmed with water analysis of samples from Bregalnica, Kamenicka and Zletovska River.

KEYWORDS: AAS, copper, zinc, iron, nickel, flotation, surfactant, chromium(III) pentamethylenedithiocarbamate, hydrated chromium(III) oxide, pentamethyleneammonium pentamethylenedithiocarbamate