

## Melaphen, melamine, and bis(hydroxymethyl)phosphinic acid. Acid-base properties and behavior in the presence of some metal cations

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### Abstract

By means of pH-metry, spectrophotometry, and mathematical modelling of equilibria (CPRESS program) the composition and acid-base properties of melaphen and its components, melamine and bis(hydroxymethyl)phosphinic acid were studied. Bis(hydroxymethyl)phosphinic acid in water solutions is associated by formation of hydrogen bonds and exists as a trimer, and also as the protonated and deprotonated dimeric, trimeric, and tetrameric anionic forms. In the melamine water solutions additionally to the known previously mono-, di-, and triprotonated cations the monoprotinated dimeric particle is found. Interaction of the melaphen components, bis(hydroxymethyl)phosphinic acid and melamine, in water solutions leads to formation of stable formally non-charged particles of the 1:1 and 2:2 composition and the deprotonated associate with 1:1 component ratio. Behavior of the compounds under study in water solutions in the presence of typical complex formers such as the two-charged cations of d-elements and lanthanum(III) is considered. Under the conditions of experiment no noticeable complex formation between melaphen, melamine, and bis(hydroxymethyl)phosphinic acid with cobalt, nickel, copper, zinc, magnesium, and lanthanum was observed. Adequate description of the pH-metric experimental data for the copper(II)-melamine system is achieved by consideration of formation of the hydroxocopper(II) cation. The equilibrial processes revealed are characterized quantitatively. © 2009 Pleiades Publishing, Ltd.

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