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## Extraction-Spectrophotometric Determination of Trace Amounts of Barium and Strontium by 18-Crown-6 and Rose Bengal Using Partial Least Squares

Jahanbakhsh GHASEMI<sup>1</sup>,  
Alireza NIKRAHI<sup>1</sup> and Ali NIAZI<sup>2</sup>

<sup>1</sup>Department of Chemistry, Faculty of Sciences, Razi University, Kermanshah-IRAN  
e-mail: jahan.ghasemi@tataa.com

<sup>2</sup>Department of Chemistry, Faculty of Sciences, Azad University of Arak, Arak-IRAN  
e-mail: ali.niazi@gmail.com

**Abstract:** Partial least squares modeling is a powerful multivariate statistical tool applied to extraction-spectrophotometric simultaneous determination of mixtures of barium and strontium. The method is based on the formation of the ternary complexes with 18C6 and rose bengal with barium and strontium. The 18C6-Ba-RB and 18C6-Sr-RB ternary complexes are quantitatively extracted into dichloromethane and the resolution of the mixtures is accomplished by partial least squares (PLS). In this study, the calibration model is based on absorption spectra in the 500-600 nm range for 25 different mixtures of barium and strontium. Calibration matrices ranges were 0.05-5.50 and 0.03-4.50  $\mu\text{g mL}^{-1}$  and detection limits were 0.036 and 0.017  $\mu\text{g mL}^{-1}$  for barium and strontium, respectively. A series of synthetic solutions containing different concentrations of barium and strontium was used to check the prediction ability of the PLS model. The RMSEP for barium and strontium was 0.1323 and 0.0327, respectively. The method was successfully applied to the analysis of spiked water (natural, tap and waste waters) samples.

**Key Words:** Partial least squares, Extraction-spectrophotometric determination, Barium, Strontium

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