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Theoretical and experimental estimation of tungsten and iron separation effectiveness for further arsenic and antimony determination in ferrotungsten by ICP-AES

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Abstract

Thermodynamic modeling with «HSC» software was used to choose a composition of the reagents mixture for ferrotungsten samples sintering before determining arsenic and antimony by inductively coupled plasma atomic emission (Na_2CO_3:K_2CO_3:S mixture). The sintering allows separating analytes from the main part of interfering tungsten matrix. Missing data for modeling, namely, thermochemical properties of some sodium and potassium antimonates and antimonites, tungsten, arsenic and antimony thiosalts were calculated by group contribution method. Further experiments showed that leaching of the cake by solution containing $Ba(CH_3COO)_2$ can additionally separate analytes from matrix components and improve the analysis results. Analysis of ferrotungsten certified reference materials showed the effectiveness of the proposed method of sample preparation.