

## 高灵敏度高选择性多组分痕量分析研究:卡尔曼滤波-分光光度法

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**摘要** 本文根据卡尔曼滤波算法结合高灵敏显色反应提出了一种新的高灵敏度高选择性多组分痕量分析方法,对卡尔曼滤波处理过程,估计初值,新息序列,信息增量等作为分析结果评价,

波长数目选择的依据等基础性理论问题进行了探讨,应用于十余种高灵敏显色反应体系,

对多种金属离子混合物及实际样品进行同时或分别测定,可不经任何分离,操作简便,结果良好。

**关键词** [分光光度法](#) [多组分体系](#) [显色反应](#) [痕量分析](#) [同时测定](#) [金属离子](#) [卡尔曼滤波](#)

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### A highly sensitive and selective method for trace multicomponent analysis: kalman filtering spectrophotometry

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**Abstract** A new method with high sensitivity and good selectivity for trace multicomponent anal. was investigated based on highly-sensitive color reaction or fluorescent chelating reaction combined with Kalman filtering treatment. Fifteen chelating reactions were employed for assay of metallic ions but give overlapped spectra and show mutual interference in their determination through obtaining the optimal estimation of their concns. by a new series of correction of the measurement of absorbance or fluorescent intensity using the recursive algorithm written in BASICA, FORTRAN and/or PASCAL languages. Also, the effect on the results from the initial values, the tendency of the state-ests., the reduction of the error covariance, the correlation of innovation sequence, and the information gain obtained from the stepwise filtering were studied and used for judging the reliability (accuracy) of the anal., for indicating the stop-point of filtering and for selecting the measurement wavelength. The results can be improved through filtering the data modified with the moving windows smoothing technique. The proposed method has been applied to the determination of Co/Ni/Cu(/Zn/Cd), Zn/Mn, and Al/Ga/Fe, rare earths, Zr/Hf, Nb/Ta, Mo/W(/Sn/Ge/Ti) in mixtures and samples with relative standard deviation f10% and/or recoveries 90-110%.1

**Key words** [SPECTROPHOTOMETRY](#) [MULTICOMPONENT SYSTEM](#) [COLOR REACTION](#) [TRACE ANALYSIS](#) [SIMULTANEOUS DETERMINATIONS](#) [METAL ION](#) [KALMAN FILTERING](#)

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