

## **A New Calibration Method Based on the Recursive Linear Regression with Variables Selection**

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We propose a new calibration method, which uses the linearization method for spectral responses and the repetitive adoptions of the linearization weight matrices to construct a feature. Weight matrices are estimated through multiple linear regression (or principal component regression or partial least squares) with forward variable selection. The proposed method is applied to three data sets. The first is FTIR spectral data set for FeO content from sinter process and the second is NIR spectra from trans-alkylation process having two constituent variables. The third is NIR spectra of crude oil with three physical property variables. To see the calibration performance, we compare the new method with the PLS. It is found that the new method gives a little better performance than the PLS and the calibration result is stable in spite of the collinearity among each selected spectral responses. Furthermore, doing the repetitive adoptions of linearization matrices in the proposed methods, uninformative variables are disregarded. That is, the new methods include the effect of variables subset selection, simultaneously.