Chiral Recognition of Amino Acids by Use of a Fluorescent Resorcinarene

Authors: Richard, Gerald I.[1]; Marwani, Hadi M.[2]; Jiang, Shan[1]; Fakayode, Sayo O.[3]; Lowry, Mark[1]; Strongin, Robert M.[4]; Warner, Isiah M.[1]

Source: Applied Spectroscopy, Volume 62, Issue 5, Pages 118A-132A and 465-590 (May 2008) , pp. 476-480(5)
Publisher: Society for Applied Spectroscopy

< previous article | view table of contents | next article >

Abstract:
The spectroscopic properties of a chiral boronic acid based resorcinarene macrocycle employed for chiral analysis were investigated. Specifically, the emission and excitation characteristics of tetraarylboronate resorcinarene macrocycle (TBRM) and its quantum yield were evaluated. The chiral selector TBRM was investigated as a chiral reagent for the enantiomeric discrimination of amino acids using steady-state fluorescence spectroscopy. Chiral recognition of amino acids in the presence of the macrocycle was based on diastereomeric complexes. Results demonstrated that TBRM had better chiral discrimination ability for lysine as compared to the other amino acids. Partial least squares regression modeling (PLS-1) of spectral data for macrocycle-lysine guest-host complexes was used to correlate the changes in the fluorescence emission for a set of calibration samples consisting of TBRM in the presence of varying enantiomeric compositions of lysine. In addition, validation studies were performed using an independently prepared set of samples with different enantiomeric compositions of lysine. The results of multivariate regression modeling indicated good prediction ability of lysine, which was confirmed by a root mean square percent relative error (RMS%RE) of 5.8%.

References: 40 references open in new window
Articles that cite this article?

Keywords: CHIRAL ANALYSIS; FLUORESCENT SENSORS; CHEMOMETRICS; PARTIAL LEAST SQUARES REGRESSION MODELING; PLS-1
Document Type: Research article
DOI: http://dx.doi.org/10.1366/000370208784344514

Affiliations: 1: Department of Chemistry, Louisiana State University, Baton Rouge, Louisiana 70803 **2:** Department of Chemistry, Louisiana State University, Baton Rouge, Louisiana 70803; Department of Chemistry, King Abdulaziz University, Jeddah, Saudi Arabia 21589 **3:** Department of Chemistry, Winston-Salem State University, Winston-Salem, North Carolina 27110 **4:** Department of Chemistry, Portland State University, Portland, Oregon 97207

Publication date: 2008-05-01

More about this publication?
Related content