

Synthesis and Properties of Hydrazine-Embedded Biphenothiazines and Application of Hydrazine-Embedded Heterocyclic Compounds to Fluorescence Cell Imaging

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Abstract

© 2018 Wiley-VCH Verlag GmbH & Co. KGaA, Weinheim Hydrazine-embedded unsubstituted butterfly-shaped biphenothiazine and its sulfoxides were synthesized by dimerization of 1,9-dibromophenothiazine, which was prepared by realizing selective debromination at the 3,7-positions of 1,3,7,9-tetrabromophenothiazine. *cis/trans*-Biphenothiazine sulfoxide was selectively prepared by changing the oxidation temperature to control the inversion rate of the butterfly shape of the intermediate. Their butterfly-shapes, conformations, photophysical properties (UV-vis absorption, fluorescence), and redox properties were elucidated by X-ray analysis, DFT calculations, spectral and electrochemical measurements. Fluorescent hydrazine-embedded biphenothiazine sulfoxides and bicarbazoles were applied to cell imaging of HeLa cells. The bicarbazoles exhibited high fluorescence signals in the cells with low toxicity.

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Keywords

carbazoles, fluorescence, hydrazines, imaging agents, phenothiazines

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