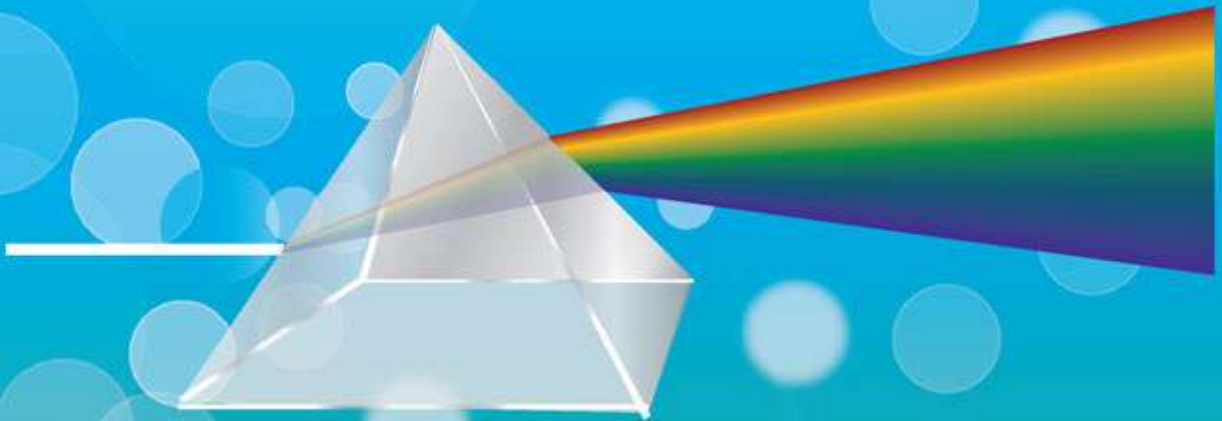


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9

–NH Protons Containing Heterocycles: Colorimetric Chemosensor for Fluoride Ion

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Comparatively less fluorescent imidazoles containing –NH ring can efficiently sense F^- ion in a polar medium like acetonitrile. Photophysics can establish the interaction of tetra-*n*-butylammonium fluoride with two different benzimidazoles via stable isosbestic and isoemissive formation. Further, proton nuclear magnetic resonance hydrogen-1 shows the interaction as abstraction of –NH proton by the F^- .

9.1 Introduction

Molecular level fluoride sensors can broadly be classified into four types: (1) molecules capable of sensing anions through hydrogen bonding interactions containing N–H, C–H, and O–H groups [1], (2) anion– π interactions [2], (3) Lewis acid-base interactions [3], and (4) anion induced chemical reactions [4]. This study is particularly projected towards H-bonding interaction. Especially at lower F^- concentrations, the H-bonding interactions between the N–H/O–H fragment of the receptor and the F^- ion are observed; however, by means of Brønsted acid-base interactions an excess of F^- ion leads to deprotonation [5].

With this evidence, two different benzimidazoles (**R-1** and **R-2**) containing –NH proton (shown in Figure 9.1) to interact with tetra-*n*-butylammonium fluoride (TBAF) in a polar organic medium (CH_3CN) were chosen. Visible color change was observed in all the cases (Figure 9.2).