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# Promotional effect of macrocyclization in O<sub>2</sub>N<sub>x</sub> naphtha-aza-crown macrocyclic ligands on fluorescence chemosensing of Al(III)

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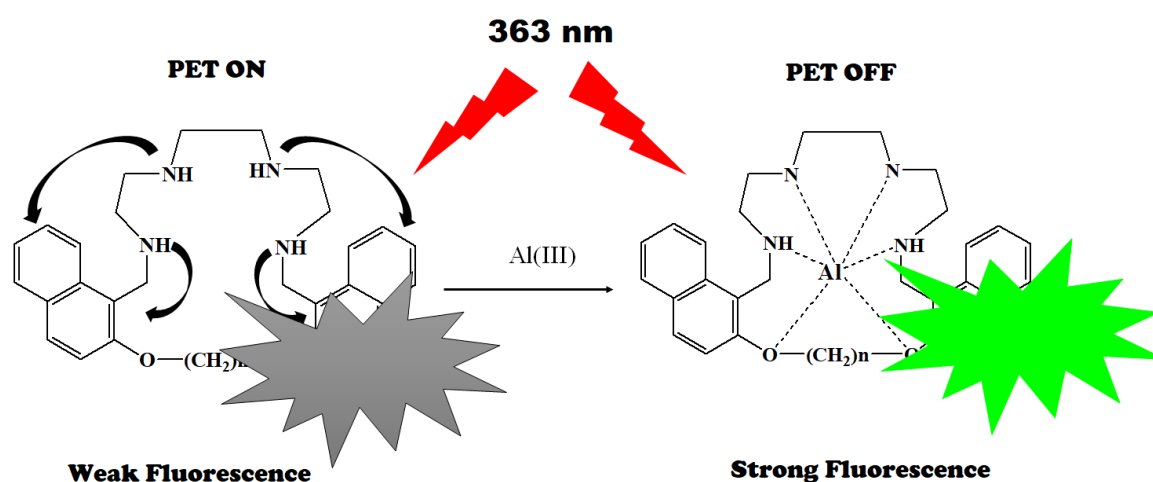
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## Abstract

Two new macrocyclic ligands **L<sub>n</sub>** (**L** and **L'**) bearing two fluorophore naphthalene moieties were synthesized and characterized by employing <sup>1</sup>H and <sup>13</sup>C NMR, IR, microanalysis as well as mass spectrometry. Comparative studies on the effect of assorted metal cations as Cr(III), Cu(II), Zn(II), Cd(II), Pb(II), Na(I), Ni(II), Co(II), Ba(II), Fe(II), Al(III), Mg(II), Cs(I), Ca(II), Hg(II), K(I), Mn(II), Ag(I), Fe(III) on fluorescence and UV-vis spectra of **L<sub>n</sub>** in ethanol illustrated that both of the macrocycles were sensitive and selective fluorescence chemosensors for Al(III). Remarkable binding constant values as  $1.36 \times 10^5 \text{ M}^{-1}$  and  $1.15 \times 10^5 \text{ M}^{-1}$  alongside 1:1 stoichiometry for Al(III)/**L** and Al(III)/**L'** were established by employing fluorescence spectrophotometry. Monitoring of probable coordination sites on **L<sub>n</sub>** to Al(III) by <sup>1</sup>H NMR spectroscopy indicated on the coordination of both N- and O-donor groups in DMSO-*d*<sub>6</sub>. In order to elucidate the effect of macrocyclic nature in this O<sub>2</sub>N<sub>x</sub> naphtha-aza-crown family on the observed fluorescence chemosensing behavior of metal ion, two new O<sub>2</sub>N<sub>x</sub>-donor macroacyclic ligands were also prepared and characterized by the abovementioned methods. The comparative experiments revealed that the macrocyclization had an escalating role on the fluorescence parameter of the macrocycle as a metal-ion chemosensor.

## Graphical abstract



**Keywords:** naphtha-tetraaza-crown, fluorescence, Al(III) chemosensor, macroacyclic

## 1. Introduction

Currently, the study of emission chemosensors for metal ion detection is primarily considerable owing to their easiness, high sensitivity, and quick responses [1-7]. In this

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