

A POLYMER TO DETECT EXPLOSIVES: TOWARDS AN EFFECTIVE SENSOR MATERIAL

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ABSTRACT

There are upwards of 100 million landmines in over 70 countries. Nitroaromatic vapours emanate from landmines and a need exists for a sensitive and robust sensor for their detection. It is the goal of this study to develop a thin, reusable, fluorescent film composed of β -cyclodextrin polymer crosslinked with epichlorohydrin, for the detection of nitro-aromatics. The fluorescent moiety, 2-naphthol, (sensing function) was incorporated into the β -cyclodextrin-epichlorohydrin polymer (trapping function). Fluorimetry, FTIR and ^1H NMR were employed to characterize the polymer and examine whether 2-naphthol was covalently linked to the β -cyclodextrin polymer network. Fluorescence quenching studies were conducted using a nitroaromatic compound, nitrobenzene, to determine the quenching efficiency. The characterization studies indicate that 2-naphthol is incorporated into the β -cyclodextrin-epichlorohydrin polymer. A difference does not seem to exist in the quenching efficiency of free 2-naphthol, 2-naphthol: β -cyclodextrin complex and the polymers by nitrobenzene.