

# Oxazine-170 in Sol-Gel Glass and PMMA Films as a Reversible Optical Waveguide Sensor for Ammonia and Acids\*

Valery Chernyak, Renata Reisfeld,\*\* Raz Gvishi  
and David Venezky<sup>1</sup>

Department of Inorganic and Analytical Chemistry  
The Hebrew University of Jerusalem, Jerusalem, 91904 Israel  
1. Naval Research Laboratory, Washington, DC 20375, USA

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Oxazine-170 is incorporated into a glass prepared by the sol-gel method. Several geometries are prepared: bulk glass, glass tubes coated on the inside and glass tubes coated on the outside. It is shown that the colour of the oxazine incorporated into the glasses changes reversibly when exposed to atmospheric ammonia or acid. Waveguides based on this material may serve as optical sensors for ammonia or acid. Comparable results are also obtained when oxazine-170 is incorporated into films of polymethylmethacrylate (PMMA); however, this latter material is less photostable. The response time of colour change depends on the thickness of the films and on the velocity of diffusion of ammonia or protons.

## 1. Introduction

A small glass capillary tube covered with oxazine perchlorate dye and fitted with a light-emitting diode and a phototransistor detector was proposed by Giuliani *et al.*<sup>(1)</sup> as an optical waveguide sensor for ammonia vapours. It was reported that 60

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\*\*Enrique Berman Professor of Solar Energy—to whom correspondence should be addressed.