

Photochemical Sensor Based on Malachite Green in Glass Films

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(Received March 19, 1992; accepted July 14, 1992)

Key words: glass film, malachite green, waveguide sensor, sensors for ammonia and acids

Glass films containing malachite green are sensitive glass waveguide sensors (optrodes) for acid and ammonia vapor or solutions. The different color changes are the result of the yellow $H(MG)^{2+}$ dication, blue-green monocation $(MG)^+$ and colorless carbinol base $HO(MG)$, and depend on the pH of the surroundings. The method enables the preparation of optically active waveguides with the sensitivity of 1-2 ppm for ammonia.

1. Introduction

The purpose of the present research is to develop remote sensors for environmental and biological impurities which will allow monitoring of *in-situ* traces of impurities such as ammonia, acid rain and bases in the atmosphere. These sensors are all solid state, based on organic indicators incorporated in sol-gel matrices. The concept of applying optical guides and fiber optical sensors for detection of various environmental impurities has been suggested recently.^(1,2)

In principle, such a system may be composed of a small light source, for example, a light emitting diode (LED) coupled with a capillary tube covered by a reagent which, by reacting with the impurities, changes its color. The activated tube may be coupled to a filter and photodetector, which appropriately measures either transmis-

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