

# NASA TECH BRIEF

## *Lewis Research Center*



NASA Tech Briefs announce new technology derived from the U.S. space program. They are issued to encourage commercial application. Tech Briefs are available on a subscription basis from the National Technical Information Service, Springfield, Virginia 22151. Requests for individual copies or questions relating to the Tech Brief program may be directed to the Technology Utilization Office, NASA, Code KT, Washington, D.C. 20546.

### Improved Transmittance Measurements with a Magnesium Oxide Coated Integrating Sphere

A simple and convenient technique has been found for extending the transmittance measurement capability of a conventional magnesium oxide coated integrating sphere system at low (near ultraviolet) wavelengths. The technique is to place a sodium salicylate-coated disk in the center of the integrating sphere. With the coated disk, the detector output is increased, and accurate transmittance measurements can be made to wavelengths of 0.25 micrometer with a tungsten lamp and to 0.22 micrometer with a deuterium lamp. Previous transmittance measurements had been limited to wavelengths of 0.32 and 0.26 micrometer, respectively, due to low signal levels, system instabilities, and electronic noise.

In use, the sodium salicylate-coated disk intercepts the radiant beam before it strikes the magnesium oxide coated sphere wall, and causes the sodium salicylate to fluoresce. The sodium salicylate fluorescence (centered about 0.435 micrometer) is at a wavelength of high magnesium oxide reflectance and increased detector (photomultiplier) sensitivity. The resulting effect is a gain in the detector output. The gain is a factor of two at a wavelength of 0.27 micrometer when the conventional spectrometer source (1 kW tungsten lamp) is used. With a deuterium lamp, the signal gain is as high as six at the short wavelengths. The increased detector output makes it possible to obtain accurate transmittance data for the shorter wavelengths without disrupting the transmittance measuring capability at the longer (visible and near infrared) wavelengths.

#### Notes:

1. This technique was developed for making transmittance measurements to determine the effect of contaminants on window materials. It can also be used for measurements on thermal control coatings and telescope mirrors.
2. The following documentation may be obtained from:  
National Technical Information Service  
Springfield, Virginia 22151  
Single document price \$3.00  
(or microfiche \$0.95)

Reference: NASA TM-X-2395 (N71-35856),  
Improved Transmittance Measurements in a  
Magnesium Oxide Coated Integrating Sphere

3. Technical questions may be directed to:  
Technology Utilization Officer  
Lewis Research Center  
21000 Brookpark Road  
Cleveland, Ohio 44135  
Reference: B72-10717

#### Patent status:

NASA has decided not to apply for a patent.

Source: Robert L. Bowman and Ernest W. Spiz  
Lewis Research Center  
(LEW-11840)