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TRANSMISSION SPECTRUM OF LITHIUM TANTALATE

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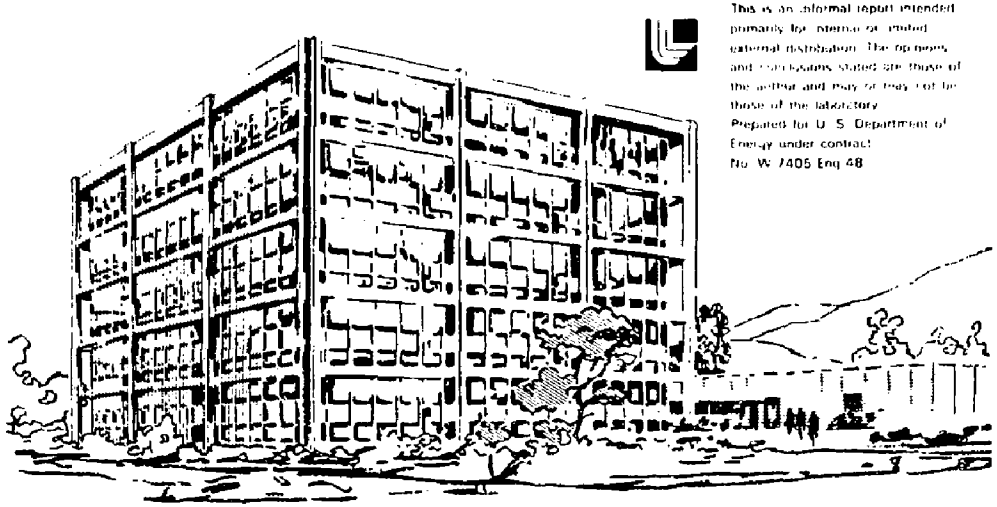

# TRANSMISSION SPECTRUM OF LITHIUM TANTALATE*

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# TRANSMISSION SPECTRUM OF LITHIUM TANTALATE

During a recent survey on a number of the optical properties of candidate electrooptic modulator crystals, it came to our attention that no well-documented data was available on the transmission spectrum of lithium tantalate in the region of its UV cut-off. As a result, we contacted Larry Castelli of Crystal Technology, Inc., and shortly thereafter received a crystal from him that was adequate for transmission measurement. The crystal had a length along the z-axis of 15 mm, and was polished on both end faces. Measurement of absorbance along the z-axis was completed using a Cary spectrophotometer Model Number 14.

Absorbance, A, is defined here as

$$A = -\log_{10} (T)$$

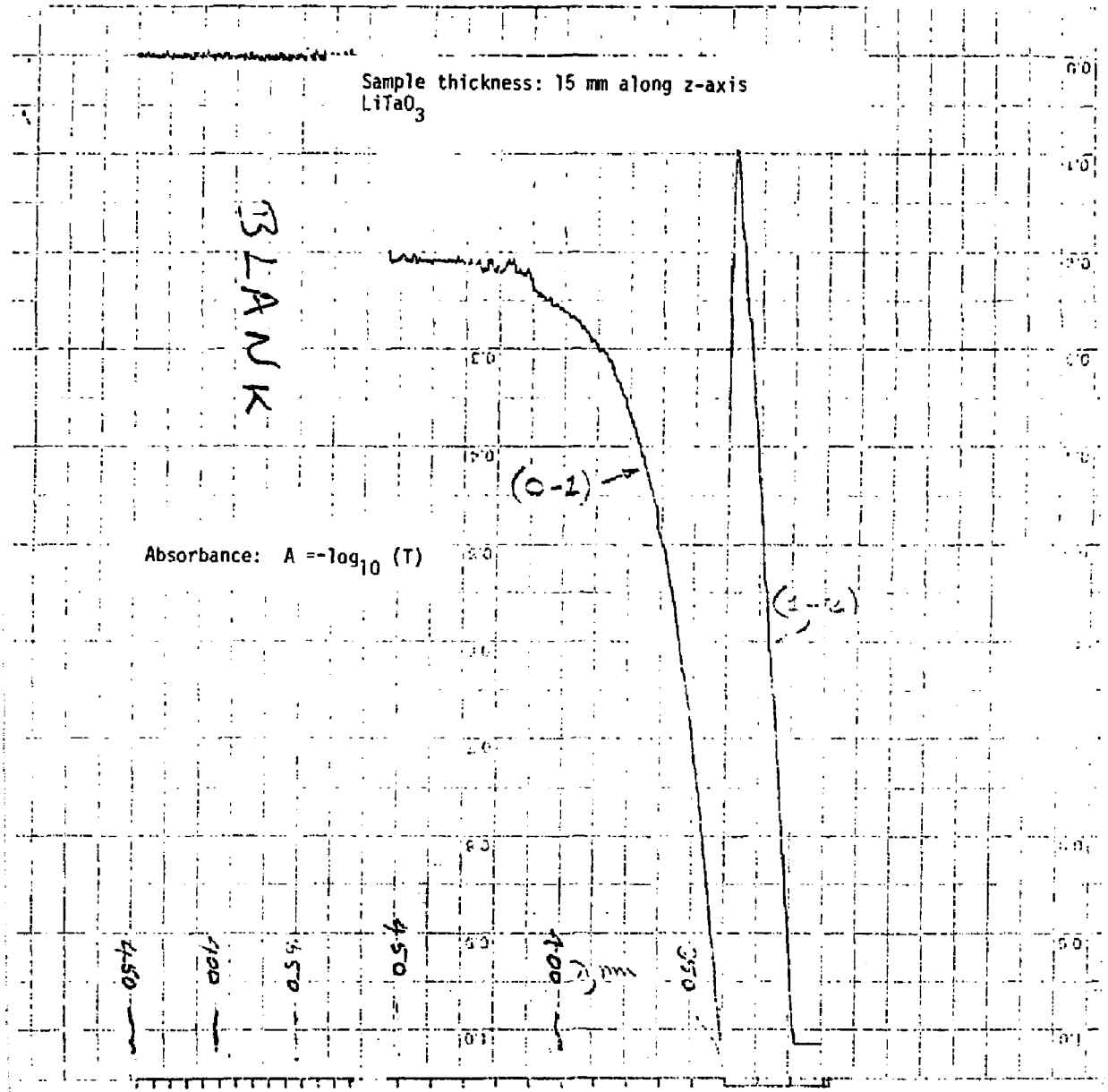
where T is equal to the transmission through the crystal.

The results of this measurement are given in Figure 1. At 450 nm, where the crystal is no longer strongly absorbing, we found that the transmission through two polished, but uncoated, faces was ≈ 62%. This compares to 73%, calculated from the equations for Fresnel reflectivity and the published index of refraction, $n_o$ (450) = 2.2420.[1] No correction was made for this limiting aperture because our primary interest was in the spectral shape and the nominal cut-off wavelength.

We believe that the major portion of this discrepancy is due to clipping of the probe beam in the Cary by the limiting aperture of the crystal.

[1] Crystal Technology data sheet on $LiTaO_3$.

FIGURE 1


Sample thickness: 15 mm along z-axis
$LiTaO_3$
BLANK
(0-1)
Absorbance: $A = -\log_{10}(T)$
450
500
550
600
650