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FACSIMILE COVER SHEET

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TO Marty Tellalian
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1. Copy of MIT's FTIR analysis, from beam tube bleeders is attached.
2. Rai suggests checking the Thomas Register for the distilling solvent recovery system sources: industrial cleaning equipment, etc.

From weiss@tristan.mit.edu Tue Nov 1 21:36:56 1994
 To: ljones@ligo.caltech.edu
 Cc: gerry@ligo.caltech.edu, lazz@ligo.caltech.edu
 Subject: FTIR data

file:irspec110194.txt
 to: L. Jones
 from: R. Weiss November 1, 1994
 concerning: Fourier Transform Infrared Spectrum

The measurements were made by evaporating 8 cc of contaminated and the pure propanol on NaCl slides. The slides were put into a Nicolet 510P spectrometer which was purged with dry nitrogen to eliminate the atmospheric CO₂. A spectrum was made of the uncontaminated sample between 500 and 5000 cm⁻¹. This became the reference spectrum. Two other spectra were then taken on the slide with contaminated sample of propanol. The first was a spectrum in the middle of the slide which showed a weak absorption spectrum when referenced to the uncontaminated sample and the second near the edge of the same slide where there was a visible white deposit. The prominent features are

	middle of slide	visibly contaminated part of slide	dynamics
cm-1	absorption	absorption	
2956-2854	0.002	0.05	C-H bond vibration
1732	0.0025	0.04	H-C-H bond vibration C-O double bond vibratio
n			
1260	0.002	0.03	C-O bond twisting
797	0.0015	0.01	Iron oxide vibration

Candidate contaminants:

Using: Sigma Library of FTIR Spectra , R. Keller QD 96.I5.K45 (1986)

Aldrich Library of FTIR Spectra, C. Pouchet QD 96.I5.R66 (1985)

Most oils both petroleum based and vegetable based are candidates. "Nujol" a mineral oil used as a matrix for samples, has the same prominent features except the one at 797 cm⁻¹

Several esters have the same lines but not in the ratios seen in the spectra.

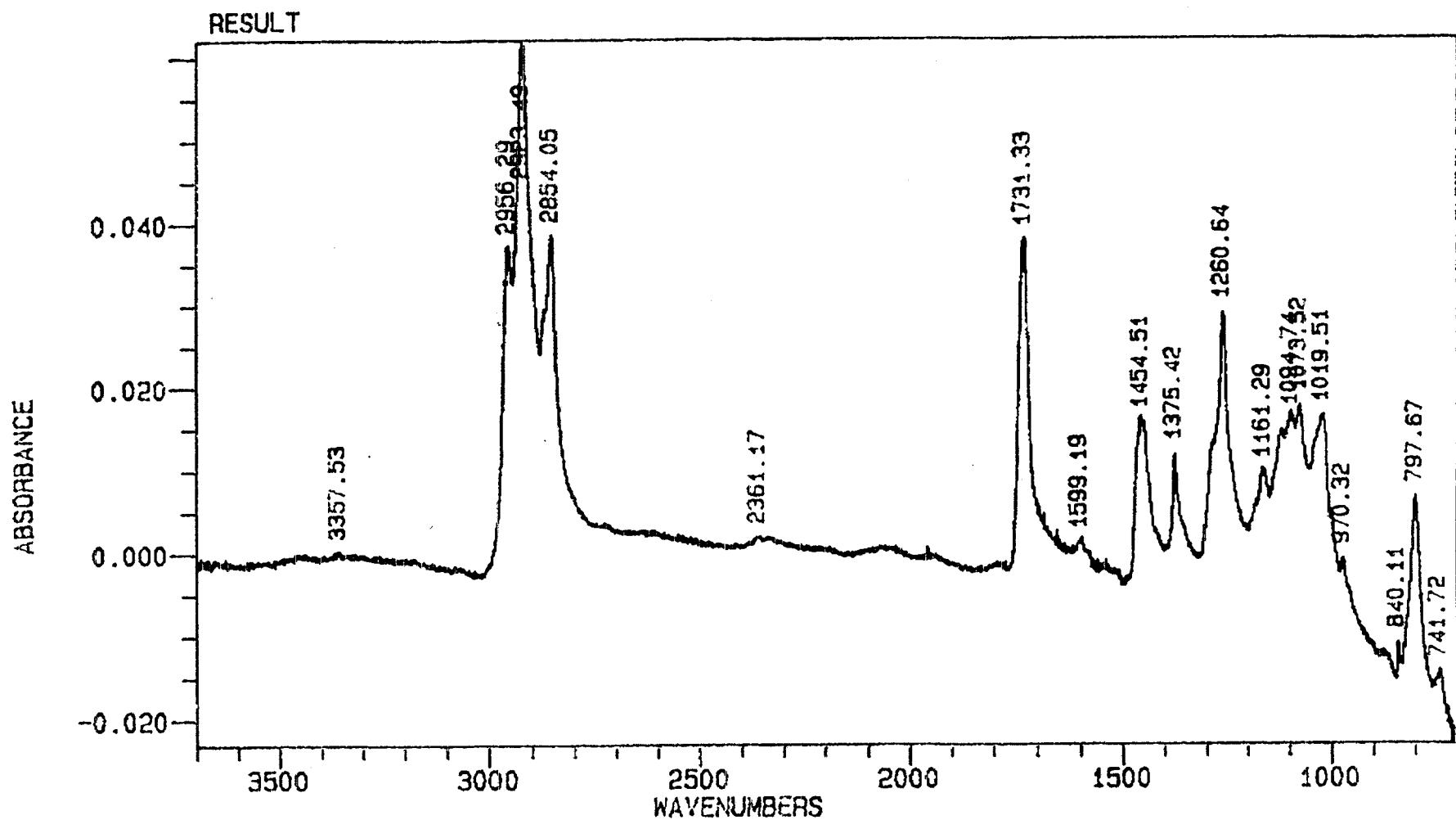
The 797cm⁻¹ line is most likely inorganic and matches Fe₂O₃

Concentration of the contaminant in the propanol is between 10⁻³ to 10⁻⁴ but this is a meaningless number since we collected samples that were concentrated to begin with.

Conclusion:

The major contaminant seen in the samples is organic and most likely from an oil on the tube surface. The surface tests will determine if the distribution

on the surface and that in the black surface depressions are comparable.



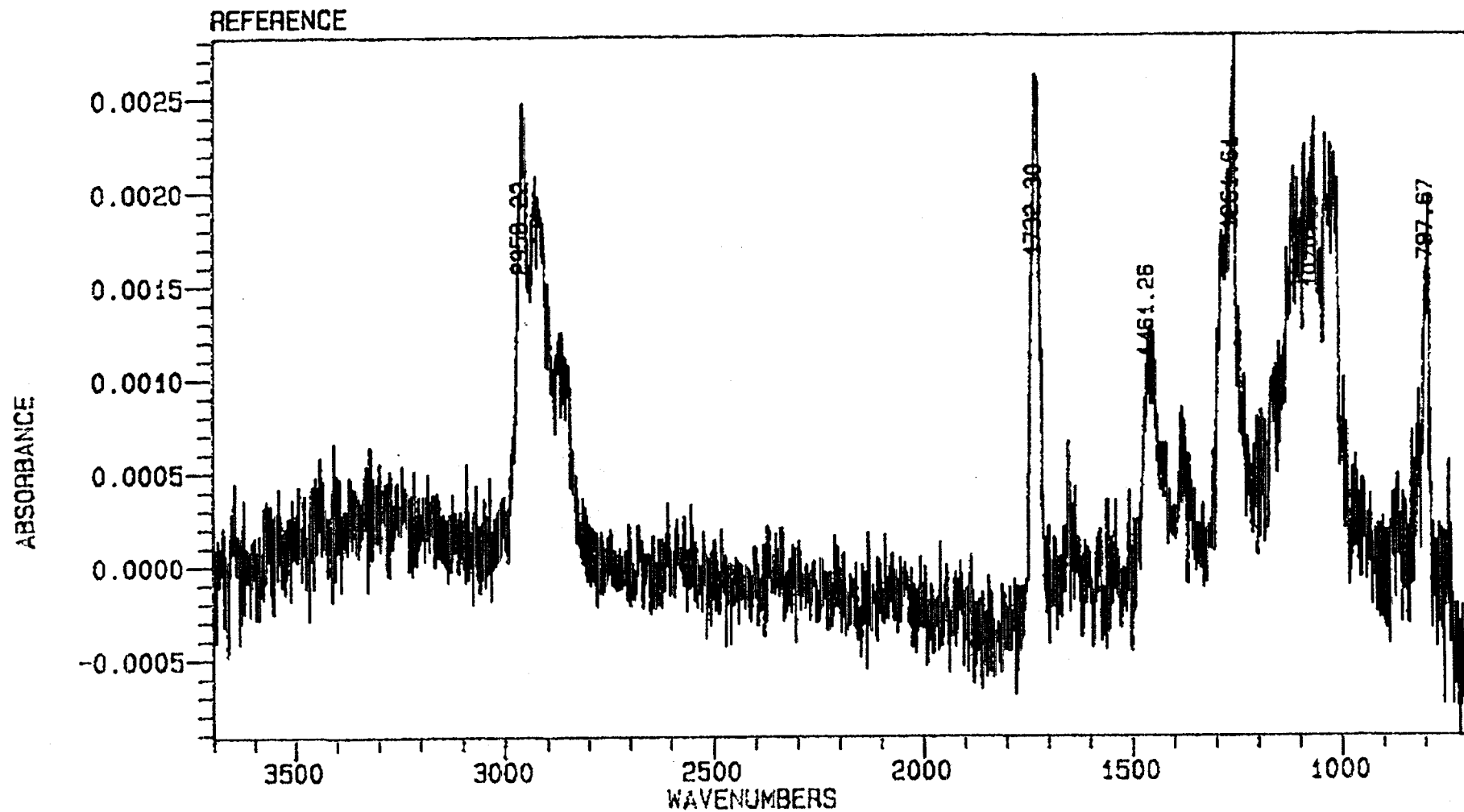
Nicolet Instrument Corporation

SAMPLE IN THICKER AREA ON NaCl

BASELINE CORRECTED

SCANS: 50 RES: 2.0 TIME: 09/24/94 12: 20: 38 FILE: SAMP3.320

cm⁻¹



TOTAL P.03

Nicolet Instrument
Corporation

SAMPLE ON NaCl
BASELINE CORRECTED

SCANS: 50 RES: 2.0 TIME: 09/24/94 12:04:44 FILE: FPVPB