GEORGIA INSTITUTE OF TECHNOLOGY
OFFICE OF RESEARCH ADMINISTRATION

RESEARCH PROJECT INITIATION

Date: April 10, 1973

Project Title: "Laser Raman Studies on the Mechanism of Cataract Lens Formation"

Project No: G-33-663 – C 32-604

Principal Investigator: Dr. Nai-Teng Yu

Sponsor: Public Health Service

Agreement Period: From April 1, 1973 Until May 31, 1973

Type Agreement: Internal Grant

Amount: $3,885

Reports Required: Summary Report to be submitted to Biomedical Sciences Support Grant Committee by August 1, 1973.

Sponsor Contact Person (s):

Dr. J. W. Crenshaw, Jr.
Chairman, Biomedical Sciences Support
Grant Committee
School of Biology
Campus

Assigned to: School of Chemistry

COPIES TO:

Principal Investigator	Library
School Director	Rich Electronic Computer Center
Dean of the College	Photographic Laboratory
Director, Research Administration	Project File
Director, Financial Affairs (2)	Dr. J. W. Crenshaw, Jr.
Security-Reports-Property ~~Office~~	File G-32-604
* Patent Coordinator	Other

RA-3 (6-71)

GEORGIA INSTITUTE OF TECHNOLOGY

OFFICE OF RESEARCH ADMINISTRATION

RESEARCH PROJECT TERMINATION

Date: December 7, 1973

Project Title: "Laser Raman Studies on the Mechanism of Cataract Lens Formation

Project No: G-33-663

Principal Investigator: Dr. Nai-Teng Yu

Sponsor: Public Health Service

Effective Termination Date: May 31, 1973

Clearance of Accounting Charges: all charges are clear

Internal grant supported by funds from G-32-604

COPIES TO:

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Security-Reports-Property Office
Patent and Inventions Coordinator

Library, Technical Reports Section ✓
Rich Electronic Computer Center
Photographic Laboratory
Terminated Project File No. _____
Other Dr. J. W. Crenshaw

G-32-604

RA-4 (5/70)

G-33-663

A Brief Progress Report

Submitted to

The Committee on Biomedical Sciences Support Grant

Title: Laser Raman Studies on the Mechanism of Cataract Lens Formation

by

Nai-Teng Yu, Assistant Professor

School of Chemistry

Georgia Institute of Technology

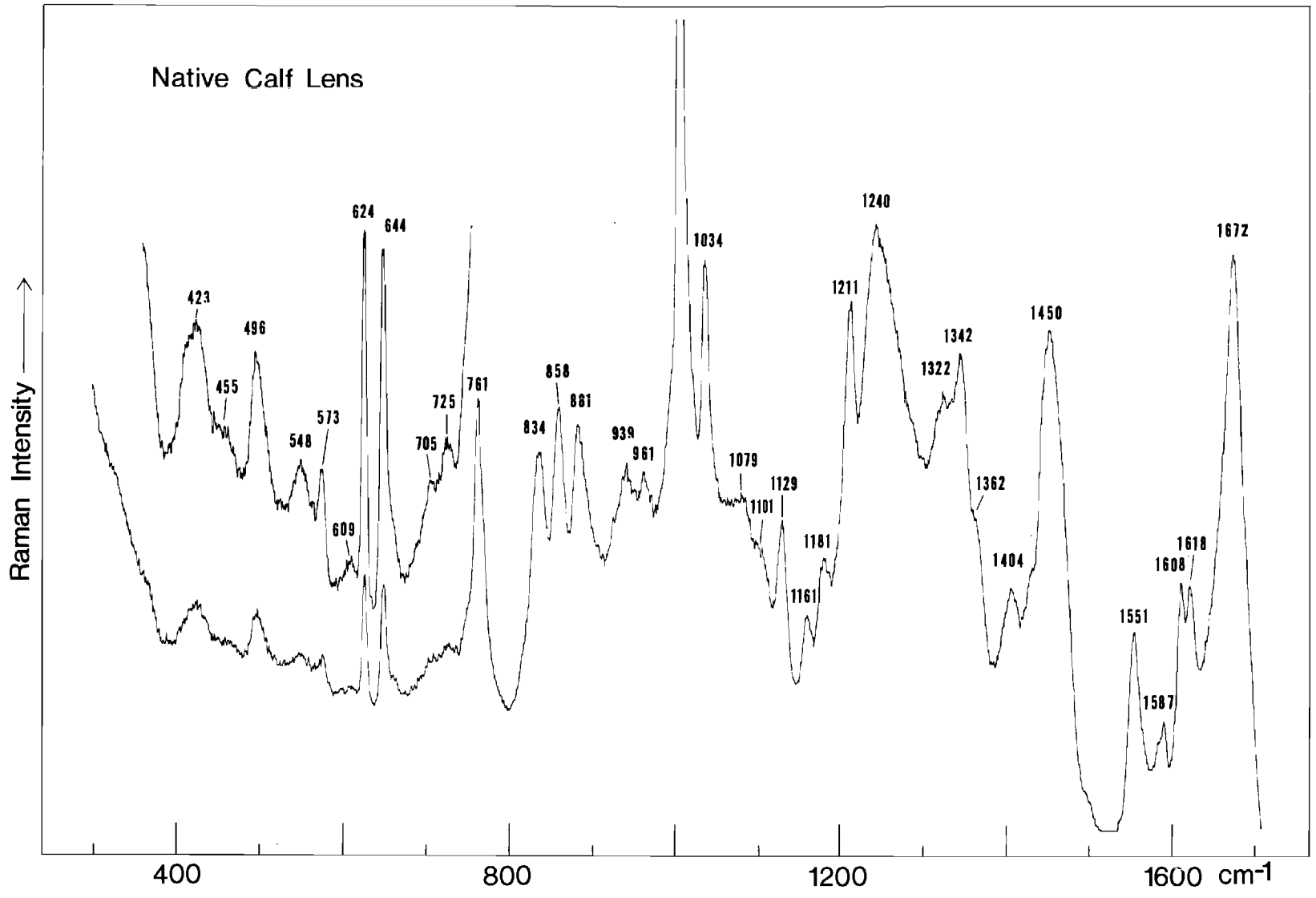
A Brief Report of Accomplishment for the Period April 1 - July 20, 1973

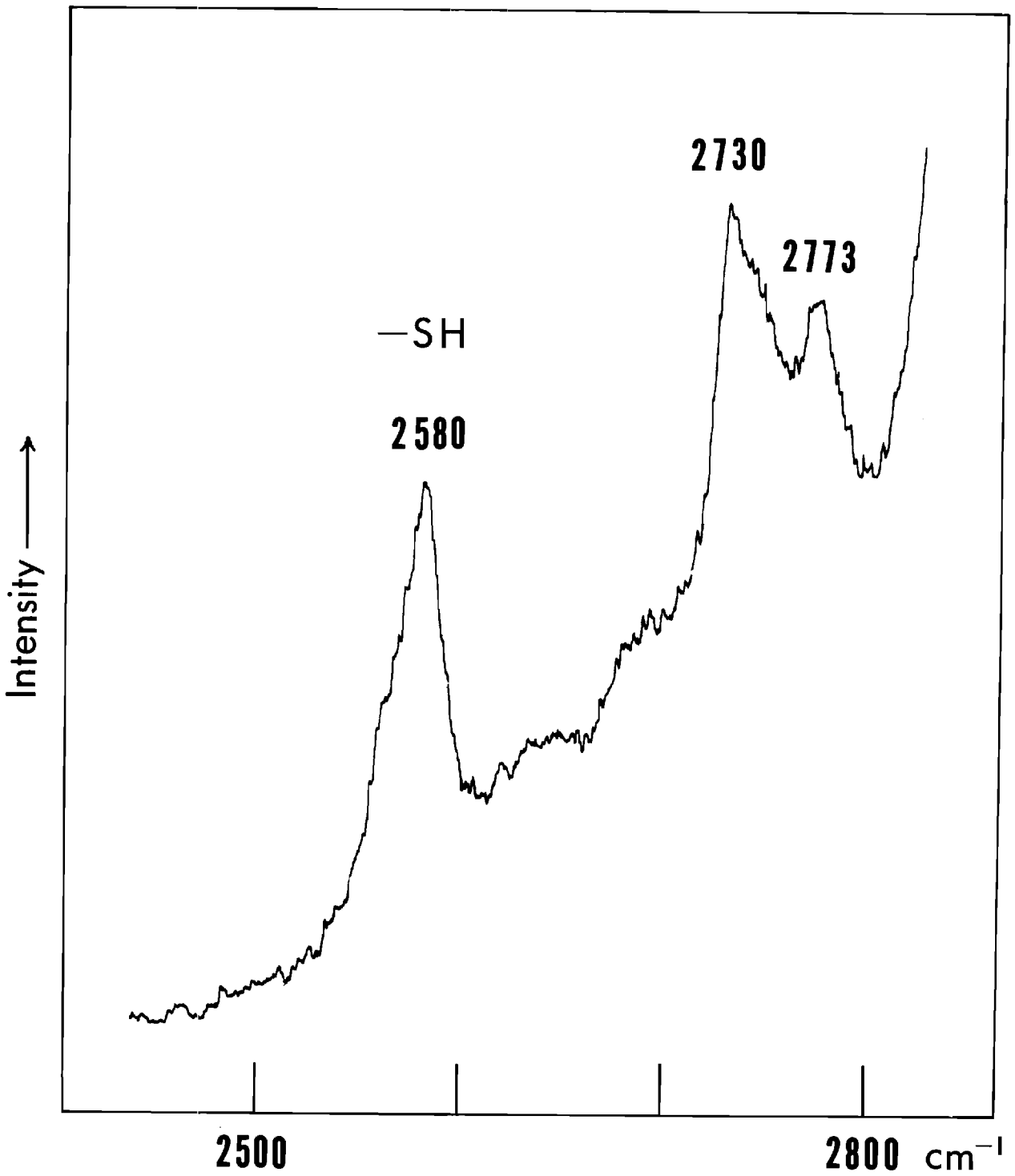
(a) We have obtained detailed Raman spectra of normal lenses from calves, rats, hogs and rabbits. The lyophilized powder of these lens specimens were also investigated by laser Raman technique. The spectra of intact normal lens from calves were shown in the attached figures. The spectral features are interesting and important. The sulfhydryl (-SH) groups in lens proteins were clearly seen at 2580 cm^{-1}. On the other hand, in the so-called amide I (1630 - 1700 cm^{-1}) and amide III (1220 - 1300 cm^{-1}) regions the spectra revealed that the lens proteins contain exclusively antiparallel β-pleated sheet conformation.

(b) A pair of cataractous lenses from rats were provided by Professor P. Azari of the Department of Biochemistry at Colorado State University. These cataract lenses were developed hereditarily for 78 days. The genes of a parent rat were damaged by X-ray irradiation. At present, we are analyzing the Raman spectra and will present the results at a later date.

(c) We have just established a UV irradiation system for the studies of the effect of UV irradiation on protein structure. We will expose the animal lenses to the UV light at 2537Å and the structural changes in proteins will be investigated by laser Raman scattering technique.

(d) We also have set up column chromatography for separating α-, β-, and γ-crystallins from lenses.


Native Calf Lens
Raman Intensity
423
455
496
548
573
609
624
644
705
725
761
834
858
881
939
961
1034
1079
1101
1129
1161
1181
1211
1240
1322
1342
1362
1404
1450
1551
1587
1608
1618
1672
400
800
1200
1600
cm-1


2730
2773
—SH
2580
Intensity
2500
2800
cm⁻¹