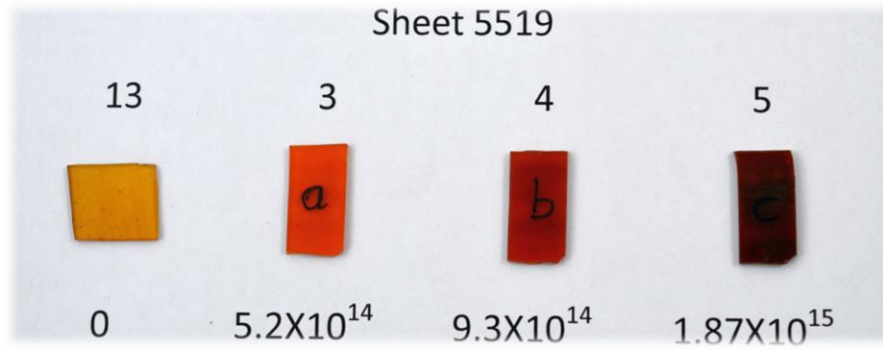


AIDA WP8.4 Common Database “IMHOTEP”

Simon Canfer, Steve Robertson, Lesley Wright,
Sarah Hughes

AIDA Final Meeting, CERN December 2014



WP8.4 partners

INFN Mi; electronic components

INFN Pg; silicon pixel detectors (APS)

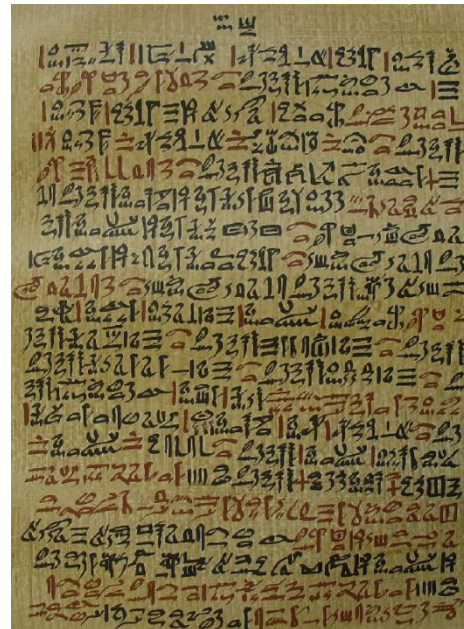
Associate ETHZ; scintillator crystals

STFC-RAL; polymers and composites

Imhotep

“Chancellor of the King of Egypt, Doctor, First in line after the King of Upper Egypt, Administrator of the Great Palace, Hereditary nobleman, High Priest of Heliopolis, Builder, Chief Carpenter, Chief Sculptor, and Maker of Vases in Chief.”

- Third Dynasty (~2650-2600BC) polymath.
- Architect of the Pyramid of Djoser (Step Pyramid)
- Possible author of the “Edwin Smith Papyrus”: a medical treatise.



www.tinyurl.com/aidaimhotep

The AIDA common database contains >240 records.

Please submit your data!

We are continuing to populate with historical data.

New features in Version 2 as suggested by Mauro Citterio now available:

Clear division between electronic components, detectors and materials; both in Search and Data Entry

Four sections:

“About you”

“About the Object”

“About the Experiment”

“About the Publication(s)”

An example of recently submitted data from ETHZ



ETHZ-IPP-2013-01
September 11th, 2013

Results on damage induced by high-energy protons in LYSO calorimeter crystals

G. Dissertori, D. Luckey, F. Nessi-Tedaldi, F. Pauss, M. Quittnat, R. Wallny

Institute for Particle Physics, ETH Zurich, 8093 Zurich, Switzerland

M. Glaser

CERN - PH Department, 1211 Geneva 23, Switzerland

Abstract

Lutetium-Yttrium Orthosilicate doped with Cerium (LYSO:Ce), as a bright scintillating crystal, is a candidate for calorimetry applications in strong ionizing-radiation fields and large high-energy hadron fluences as are expected at the CERN Large Hadron Collider after the planned High-Luminosity upgrade. There, proton-proton collisions will produce fast hadron fluences up to $\sim 5 \times 10^{14}/\text{cm}^2$ in the large-rapidity regions of the calorimeters.

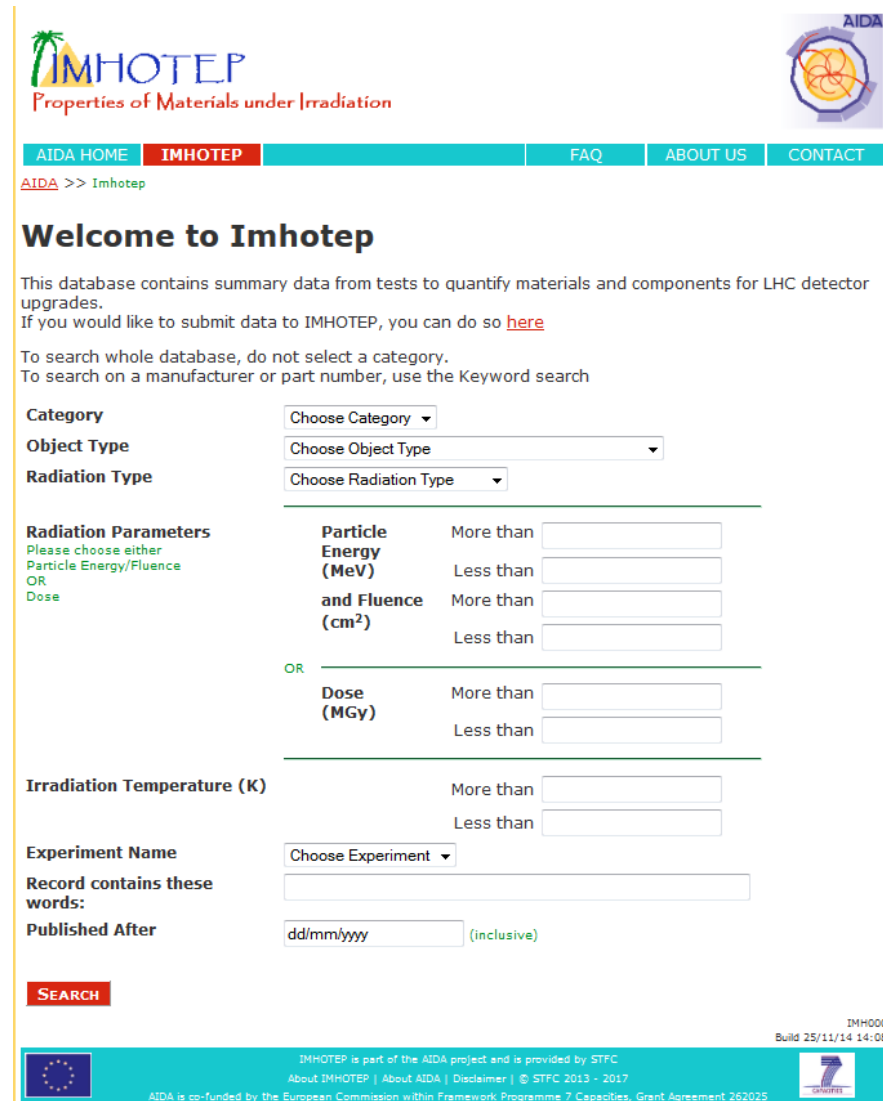
The performance of LYSO:Ce has been investigated, after exposure to different fluences of 24 GeV/c protons. Measured changes in optical transmission as a function of proton fluence are presented, and the evolution over time due to spontaneous recovery at room temperature is studied.

The activation of materials will also be an issue in the described environment. Studies of the ambient dose induced by LYSO and its evolution with time, in comparison with other scintillating crystals, have also been performed through measurements and FLUKA simulations.

arXiv:1309.3872v1 [physics.ins-det] 16 Sep 2013

Externally visible IMHOTEP page -Search from here

**Note browsers can behave differently; for example “Back” buttons. Firefox appears to be the most predictable*



The screenshot shows the IMHOTEP website search interface. At the top, there is a navigation bar with links for AIDA HOME, IMHOTEP (highlighted), FAQ, ABOUT US, and CONTACT. Below the navigation bar, the text "AIDA >> Imhotep" is displayed. The main heading is "Welcome to Imhotep". The introductory text states: "This database contains summary data from tests to quantify materials and components for LHC detector upgrades. If you would like to submit data to IMHOTEP, you can do so [here](#). To search whole database, do not select a category. To search on a manufacturer or part number, use the Keyword search".

The search form includes the following fields:

- Category: Choose Category (dropdown)
- Object Type: Choose Object Type (dropdown)
- Radiation Type: Choose Radiation Type (dropdown)
- Radiation Parameters: Please choose either Particle Energy/Fluence OR Dose. This section contains two groups of input fields:
 - Particle Energy (MeV) and Fluence (cm²): More than and Less than (input fields)
 - Dose (MGy): More than and Less than (input fields)
- Irradiation Temperature (K): More than and Less than (input fields)
- Experiment Name: Choose Experiment (dropdown)
- Record contains these words: (input field)
- Published After: dd/mm/yyyy (input field) (inclusive)

A red "SEARCH" button is located below the form fields.

At the bottom of the page, there is a footer with the following information:

- IMHOTEP is part of the AIDA project and is provided by STFC
- About IMHOTEP | About AIDA | Disclaimer | © STFC 2013 - 2017
- AIDA is co-funded by the European Commission within Framework Programme 7 Capacities, Grant Agreement 262025
- IMH000 Build 25/11/14 14:08
- Logos for the European Union and the 7th Framework Programme.

Externally visible results page

IMHOTEP - Results

9 records have been found from your search referencing 9 datasheets. Click on a record to see the details. You can also download this record set as a .csv file which can be viewed using MS Excel.

Details	Object Grade Type		Geometry/Test Type	Observable	Dose (Mgy)	Datasheet Publication Date(s)
Details	Epoxy Araldite F	HY905+DY040+DY061	Flexural ASTM D790	RI	30.0000	18/05/1998
Details	Epoxy MY 745 (100) + HY 906 (90) + DY 073 (1.5)		tensile	RI	20.0000	18/05/1998
Details	Epoxy Ciba MY745+EPN1138+CY221+HY905+DY073		tensile	RI	20.0000	18/05/1998
Details	Epoxy Isola Durotenax	521-02	tensile	RI	30.0000	18/05/1998
Details	Epoxy Araldite F	CY205	Flexural to ASTM D790	RI	30.0000	18/05/1998
Details	Epoxy Ciba	MY790 HY1102BD	tensile	RI	50.0000	18/05/1998
Details	Epoxy 3M	Scotchcast 9	Flexural ASTM D790	RI	29.0000	18/05/1998
Details	Epoxy 3M	Scotchcast 281	Flexural ASTM D790	RI	29.0000	18/05/1998
Details	Epoxy 3M	Scotchcast 824	Flexural ASTM D790	RI	29.0000	18/05/1998

DOWNLOAD this produces a .csv file that can be opened in Excel

RETURN TO SEARCH

Click on “details”
to drill down
to a full record
In this case a
link to a CERN
report is given

IMHOTEP - Detailed Results for Epoxy

About the Object

Category	Material
Object Type	Epoxy
Grade	Araldite F CY205
Sample Geometry or Test Type	Flexural to ASTM D790
Sample Dimensions	30

About the Experiment

Experiment	LEP
Radiation Type	ASTRA Ebene 1 position
Single Event or Cumulative Effect	Cumulative Effects

Radiation Parameters

Particle Energy (MeV)	1.00
Particle Fluence (cm ²)	Not given for this sample
Dose (Mgy)	30.0000
Particle Flux (/cm ² /h)	Not given for this sample
Non-Ionizing Dose (Mgy)	Not given for this sample
Time of measurement after irradiation (hours)	Not given for this sample
Irradiation Temperature (K)	333
Additional Irradiation Conditions	gamma and 5% fast neutrons. mean dose rate 200kGy/h

Observables

Observable 1	RI = 6.7
Measurement Conditions	Not given for this sample

About the Publication(s)

Source of Information	CERN
DataSheet 1	<p>Compilation of radiation damage test data Part 2: Thermoset and thermoplastic resins, composite materials</p> <p>Published 18/05/1998</p> <p>Citation (none)</p> <p>Keywords R483</p> <p>Original Link</p> <p>http://cds.cern.ch/record/357576?ln=en</p>

Externally visible
Suggest data
-up to 3 PDF
files can be
added


Imhotep: Suggest Datasheet - Suggest Dataset


If you would like to submit a datasheet or link to Imhotep, please use the form below


The Data Manager will review all submissions and decide whether to include them


 Mandatory Field

About You


 Your Name


 Your Affiliation
Organisation or similar affiliation

 Your Email Address


 Please confirm that you have the right to submit this datasheet or link You own this datasheet, or have permission from the datasheet owner, or it is in the public domain

About the Object

 Category or enter new value

 Object Type or enter new value


Grade

 Sample Geometry or Test Type or enter new value

Sample Dimensions

About the Experiment

Experiment or enter new value

 Radiation Type

Data flow

External user submits data to External server

Data transferred to Internal server overnight

Data Manager Approves or Rejects submission

Approved record transferred to External server overnight

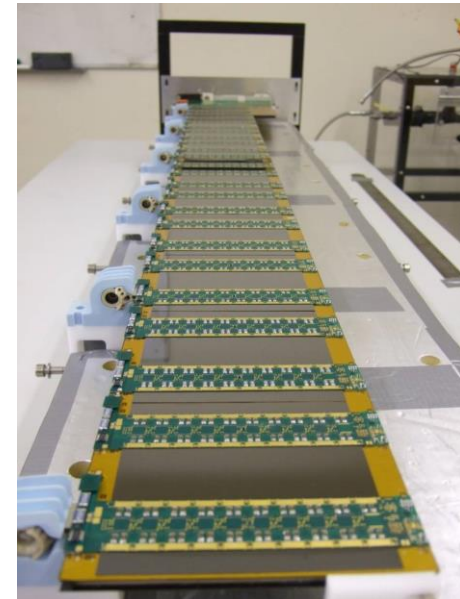
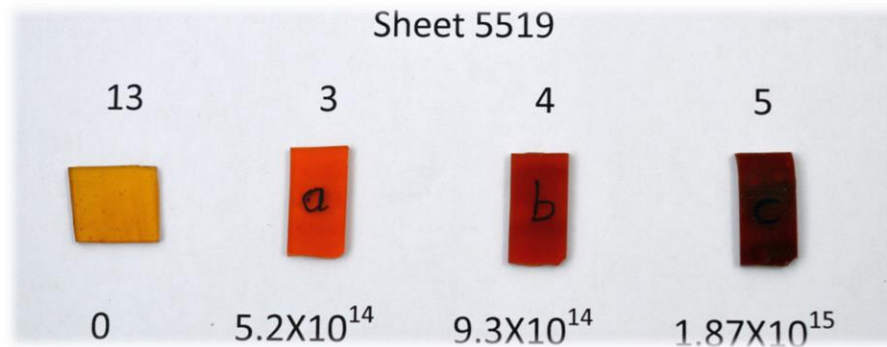
OR: direct entry by data manager

Both internal and external servers replicated four times a day to backup servers.

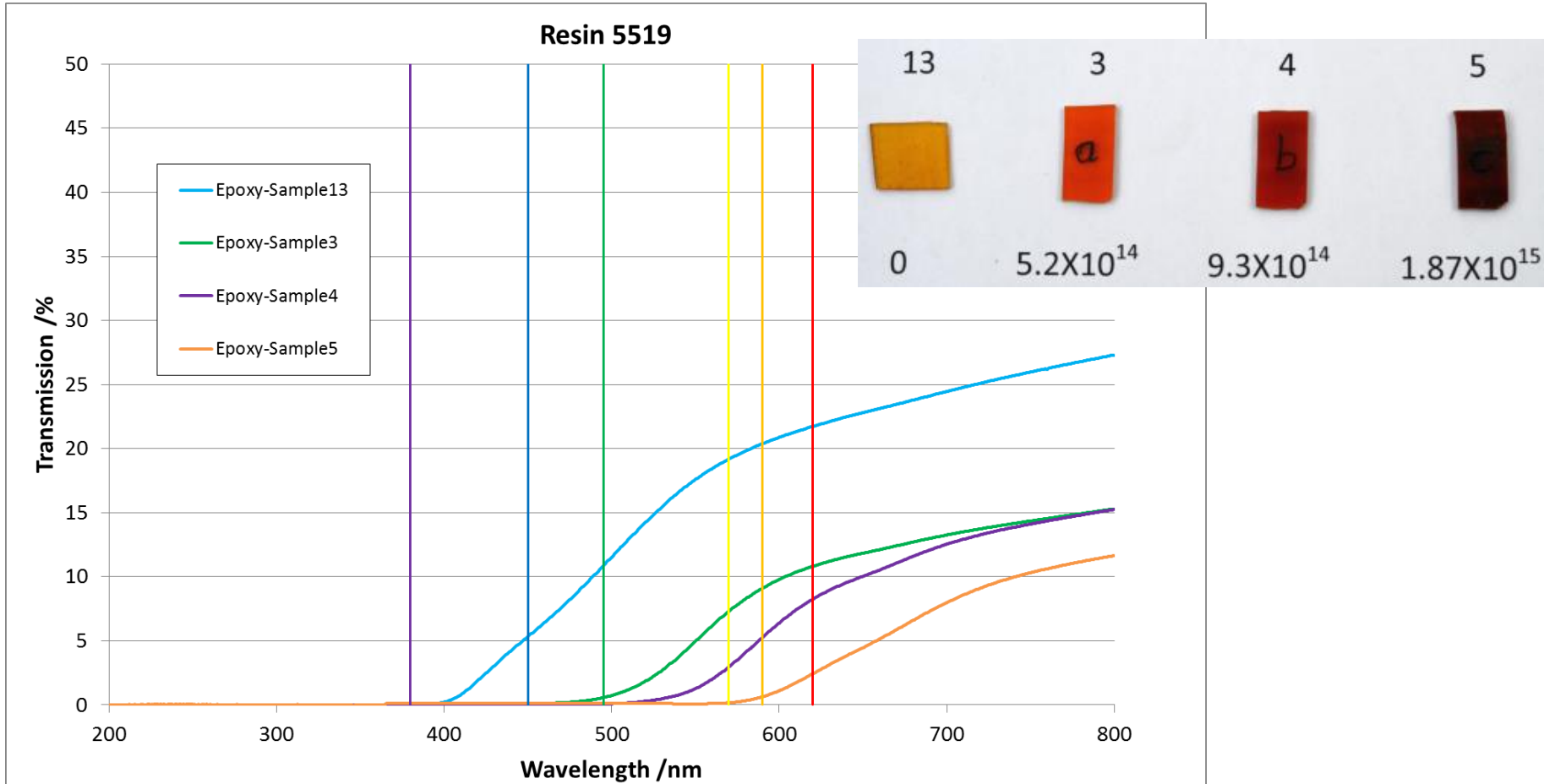
The urls can be swapped between the pairs of machines to allow for power outages, patching and other similar occurrences; this process will be invisible to users.

More detail on database design available in our report, AIDA
D8.7

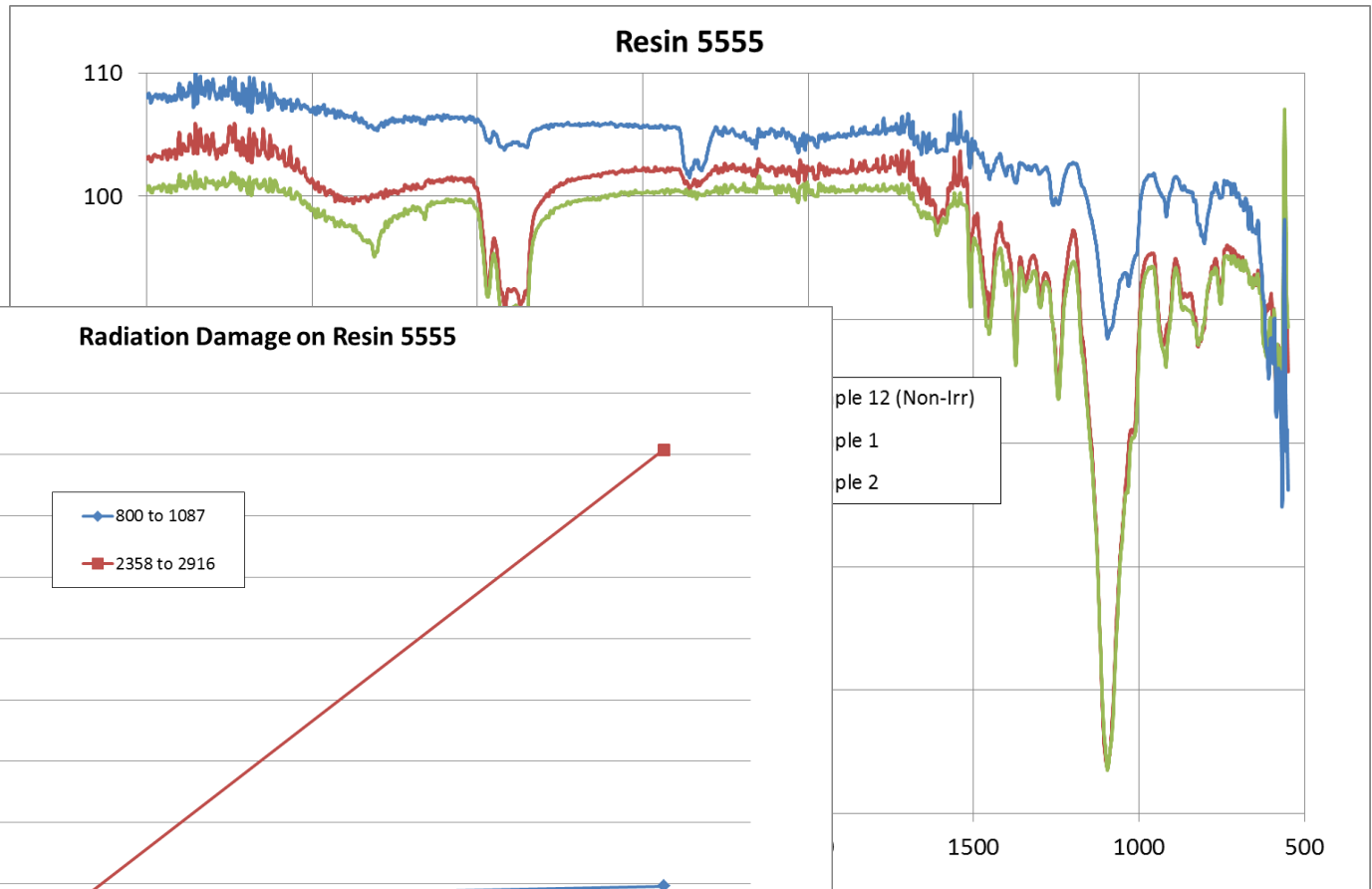
Recent results on flexible epoxies formulated at STFC for detector mounting



UV-Vis Spectroscopy

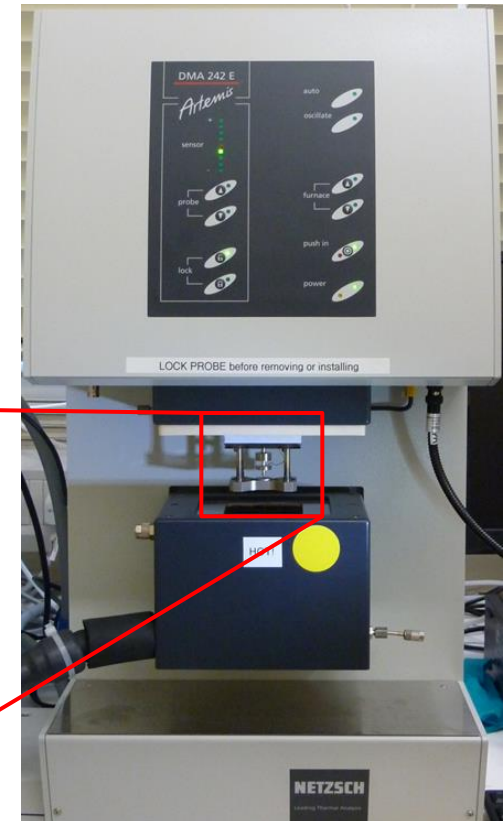
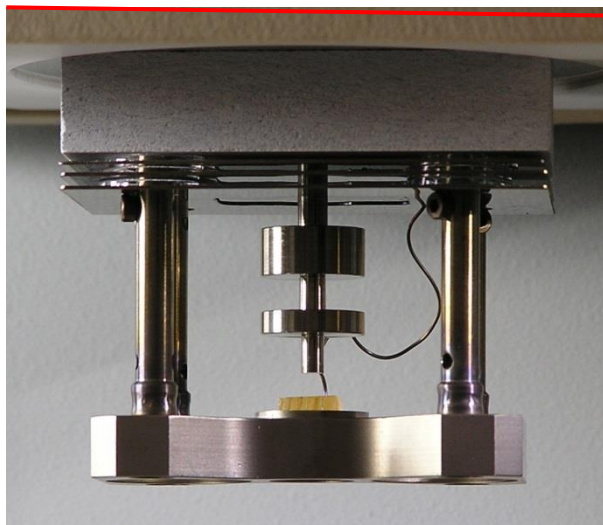


FTIR Spectroscopy

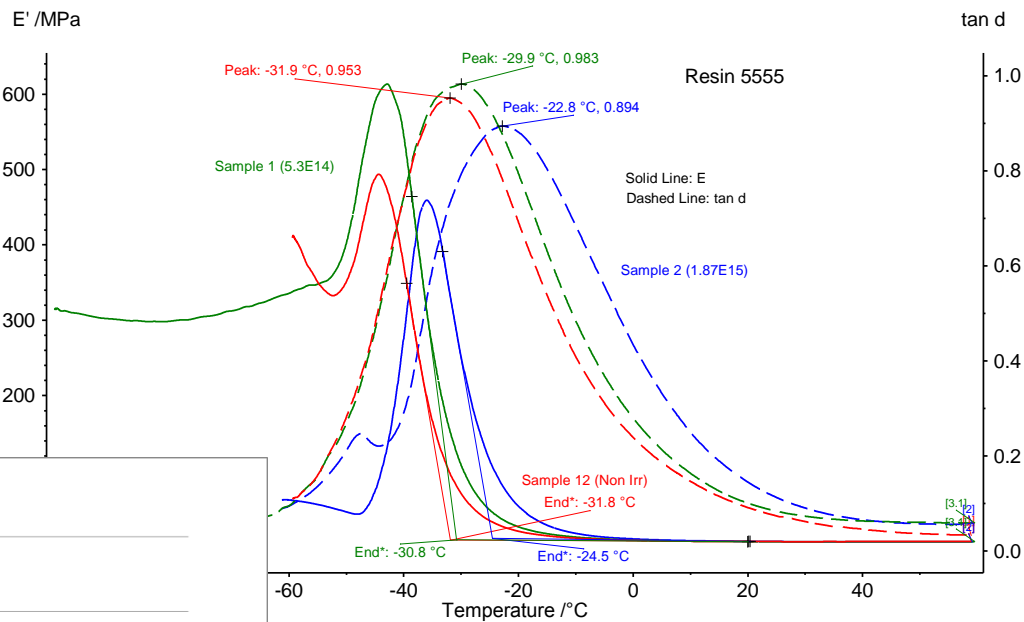


Dynamic Mechanical Analysis

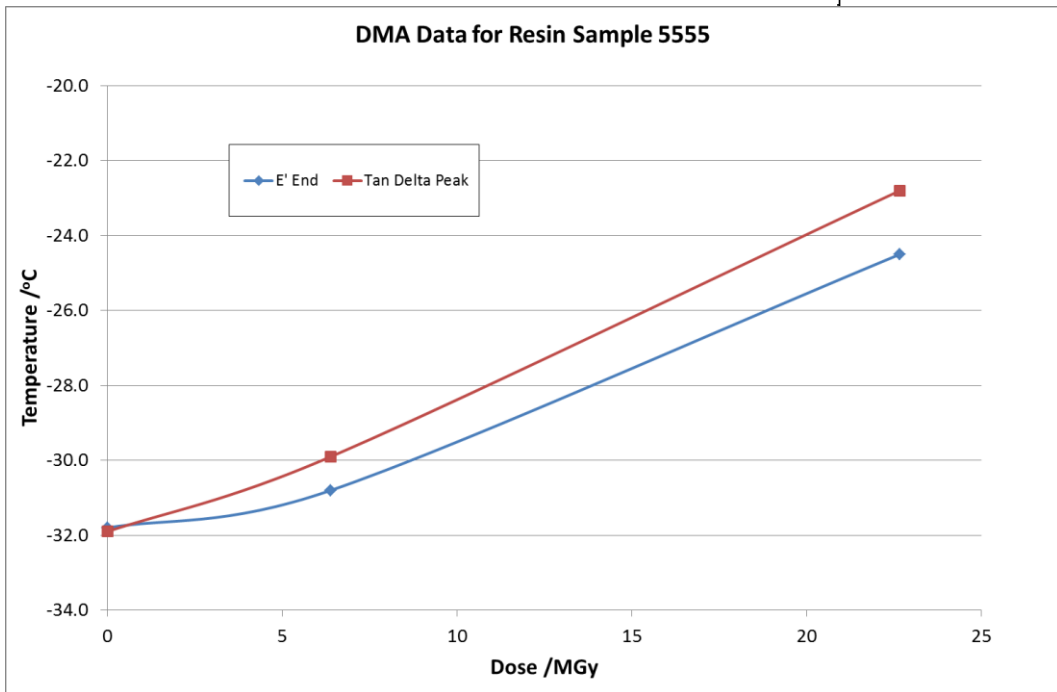
- Applies oscillating forces to sample.
- Many geometries (tensile, penetration, flexure)
- Measures mechanical changes in materials as they are heated (e.g. glass transition)



DMA Results

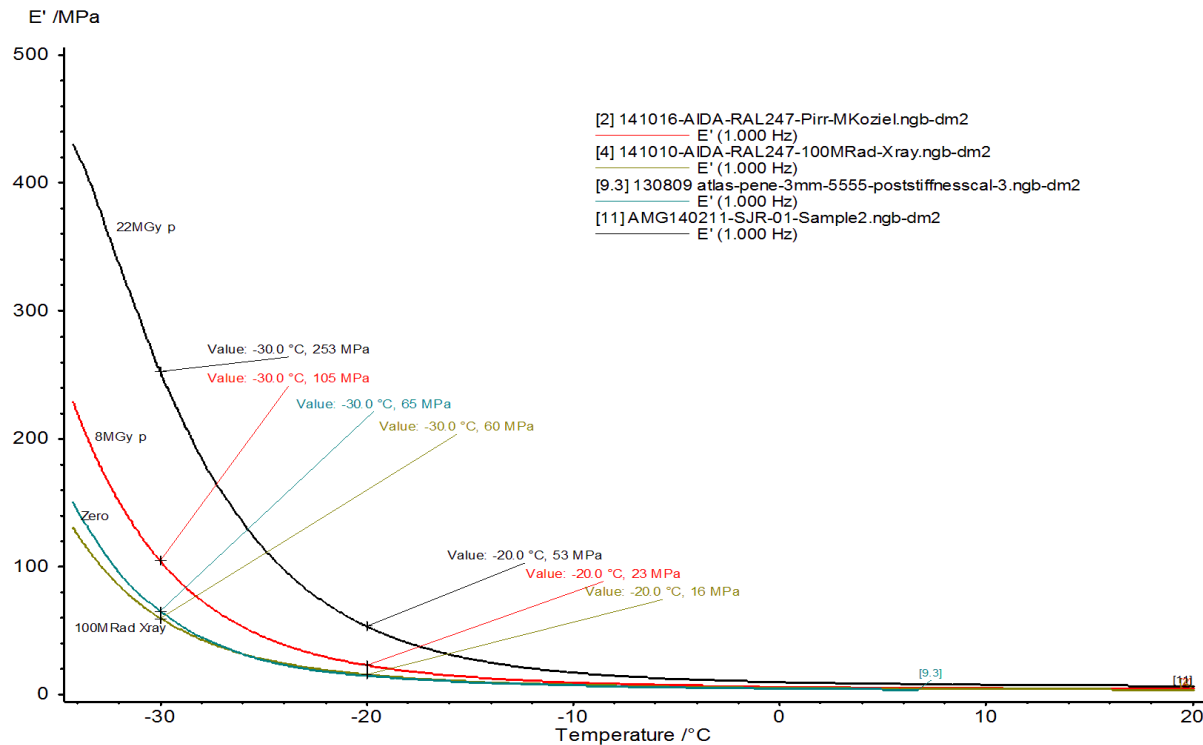


DMA Data for Resin Sample 5555



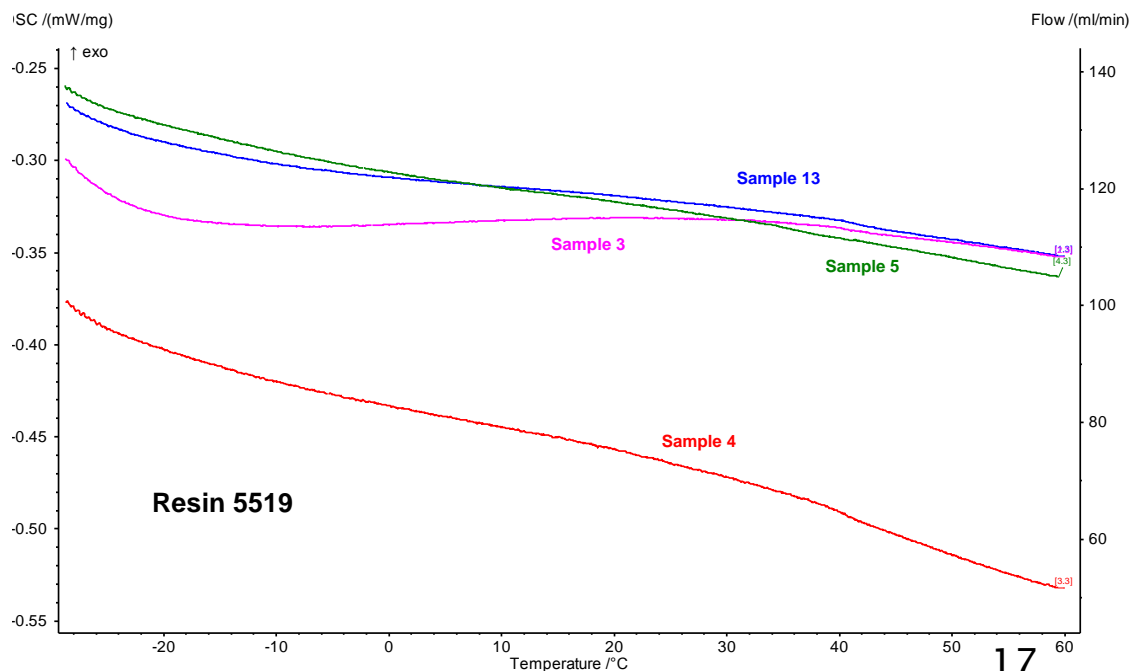
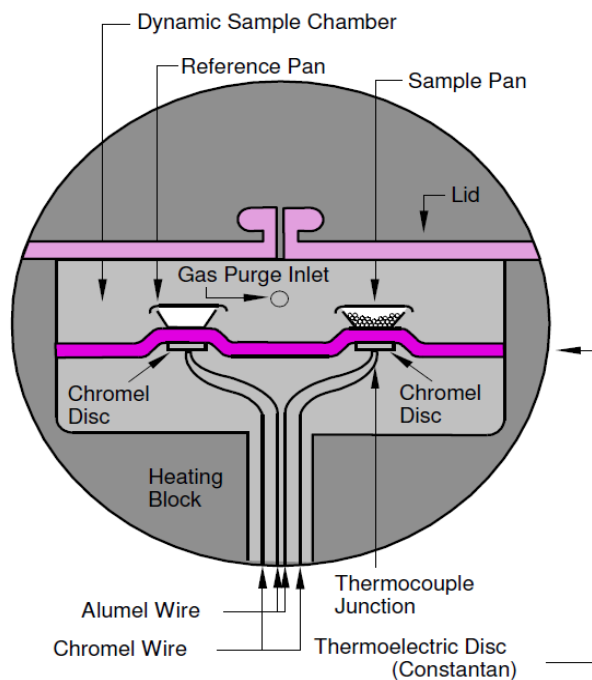
DMA Results (2)

Modulus vs temperature:
 Showing a slight increase in T_g and
 stiffness with p dose



Differential Scanning Calorimetry

- No significant features observed in the temperature range available



Summary

- UV-Vis Spectroscopy useful; epoxy darkened with increasing dose
- FTIR can show some of the damage processes occurring in the resin.
- DMA shows increasing T_g with radiation dose suggesting further crosslinking.
- DSC does not appear to offer useful information
- Ongoing work to accelerate cure of flexible epoxy; ideally ambient temperature cure

Thank you for your attention

Please submit your data!

www.tinyurl.com/aidaimhotep