

#### Nuclear Graphite TSL Evaluation and Cross Sections

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# Acknowledgment







HIGH FLUX ISOTOPE REACTOR

SPALLATION NEUTRON SOURCE







The University of Manchester

## Nuclear Graphite Manufacturing Process



## **Graphite Samples**

Туре	G347A	PGA
Processing	Isostatic Pressing	Extrusion
Grain Size (mm)	0.05	0.8
Isotropy	Isotropic	Non-isotropic
Density (g/cm <sup>3</sup> )	1.85	1.70
Porosity (%)	18	25
Sample mass (g)	0.52	5.0
Source	Tokai Carbon Co. Ltd.	University of Manchester
Polarized Optical Micrographs	<u>100µт</u>	

## Scheme of Work



## Scattering Function S(Q,E)



6



### Measured & Calculated Double Differential Scattering Cross Sections





### **Cross Sections**





## **Cross Sections**





## Conclusion

✓ The inelastic neutron scattering technique was successfully used to measure the scattering functions, double differential scattering cross-sections as well as the full phonon density of states of the G347A and PGA nuclear graphite at room temperature.

- Excellent agreement found between the measured scattering functions of nuclear graphite (G347A and PGA) and calculated scattering functions of theoretical graphite
- Excellent agreement between the calculated graphite cross section including the coherent one phonon and the measured data of HOPG and AGOT graphite.
- The high cross section of nuclear graphite cannot be attributed to neutron-phonon interaction, it is due to the small angel neutron scattering.

# Thank you