The University Of Sheffield.

Department
Of
Materials Science &
Engineering

NucleUS
Immobilisation Science Laboratory

Understanding actinide sorption and binding to cement materials

Antonia Yorkshire

Dr. Claire Corkhill

Prof. John Provis

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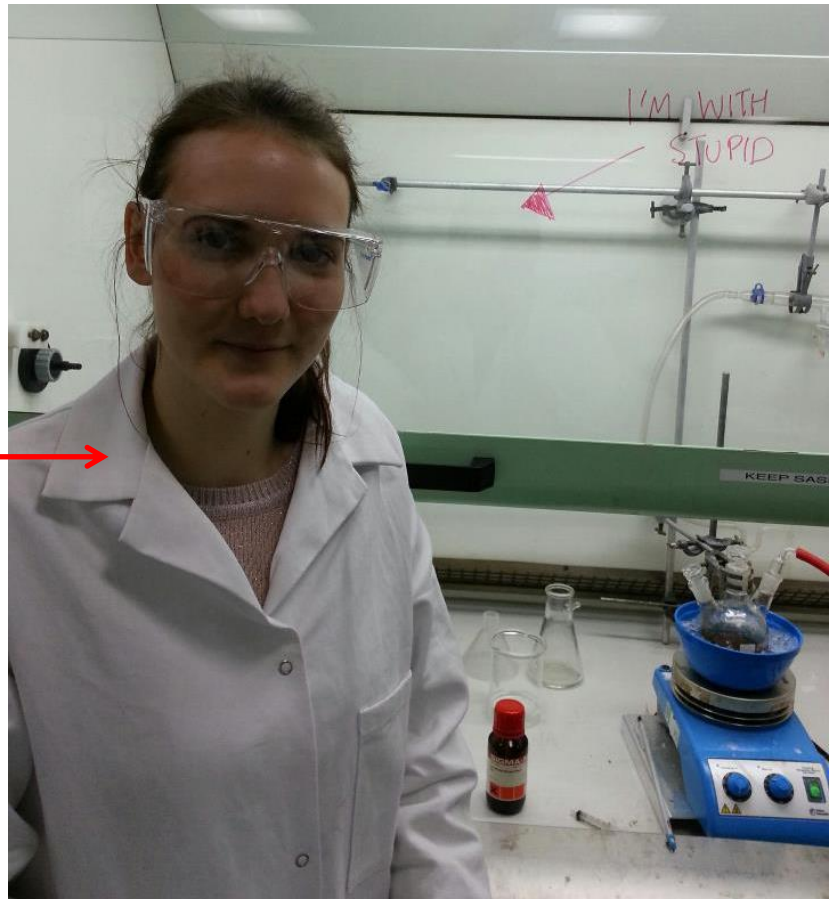
About me…

- Yorkshire by name, but not Yorkshire by nature
- Me doing some science
- University of Manchester MChem Chemistry graduate
- Worked with Dr. Carolyn Pearce, looking at radionuclide sorption to phyllosilicate (clay) minerals



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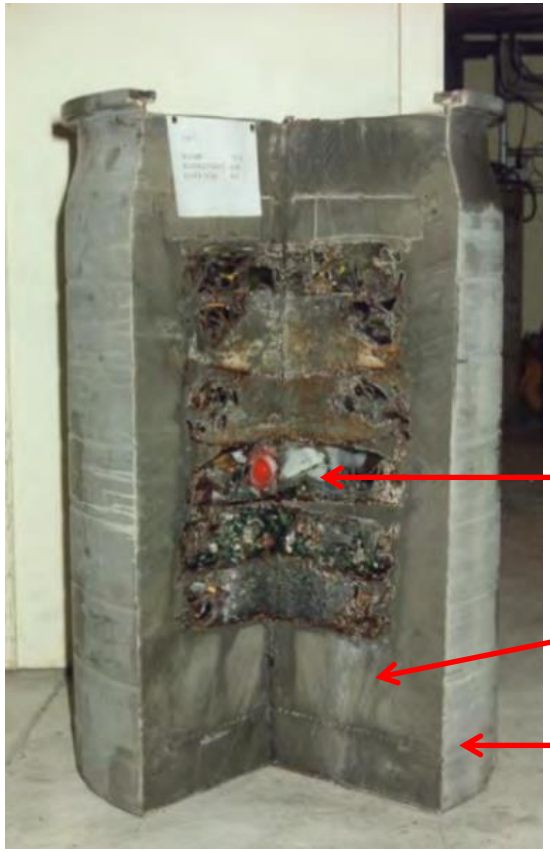
Why this project?



Plutonium contaminated materials (PCM):

- Sub-category of ILW
- Excess of 20 000 m^3 (Sellafield site alone)[1]
- Disposal via encapsulation in cement

[1] Department of Energy & Climate Change (DECC) and the Nuclear Decommissioning Authority (NDA), The 2010 UK Radioactive Waste Inventory:

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PhD plan

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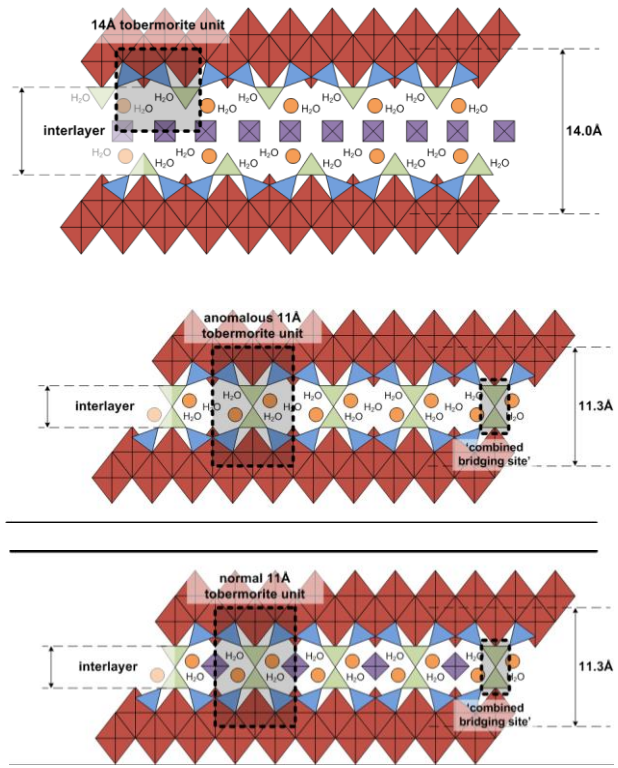
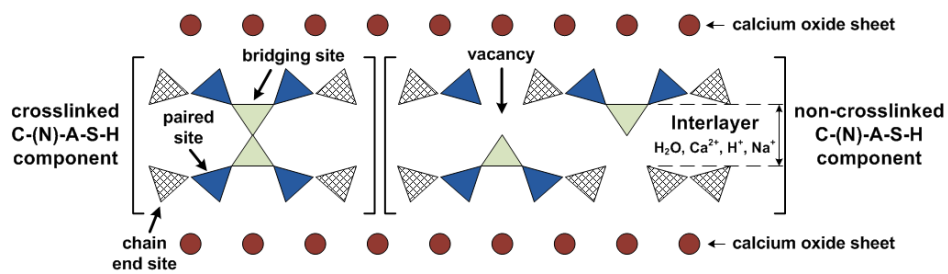
Pu containing cement samples



Understand the mechanisms of sorption:

- Under variable redox conditions
- Under controlled carbonate conditions

- **Batch sorption (static and dynamic)**
- **Solid state characterisation (µ-XAS and solid state NMR)**



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Nuclear Decommissioning Authority

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Thank you to:

- Claire Corkhill
- John Provis
- NDA
- NNL
- DISTINCTIVE consortium

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