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Small-angle neutron scattering: a high resolution, non-destructive probe of biomacromolecular structure

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Neutrons are of particular utility in the characterisation of biomaterials because of the large difference in their interaction with the ^1H nucleus compared with the ^2H nucleus. This allows contrast variation experiments to be performed in which certain components of complex biomaterials are made to be “invisible”. In addition, neutrons do not damage biomaterials in the same way as their x-ray counterparts may do.

Small-angle neutron scattering has been used to successfully reveal the molecular architecture of a range of biomaterials. I will describe its use in several systems and will include the following areas:

Diblock copolypeptides constructed via designed molecular self-assembly
Nanomolecular architecture of biodegradable biopolymer inclusion bodies
Temperature response of dental-ceramics
Characterisation of medical biosurfaces resistant to biofouling