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Deuterated Molecules From Custom Synthesis Facilities- Opportunities and Challenges

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The molecular deuteration of organic compounds and biomolecules is an essential requirement in many neutron scattering and other characterization techniques. This need has been increasingly recognized by neutron facilities and research groups around the world. The custom synthesis of deuterated molecules can be laborious and costly to achieve optimum chemical as well as isotopic purity. Users of deuterated molecules can have different requirements for their deuterated molecules depending on the type of experiments they are performing. This becomes particularly challenging to commercial suppliers who are driven by market demand of specific and defined products. As such, custom synthesis of deuterated molecules tailored to the neutron users' need can produce more useful deuterated products. A better choice in deuteration decisions, made in consultation between the user-scientist, the deuteration scientist, and the neutron scattering scientist, can enable cost-effective experiments that are otherwise hindered by the elevated costs of the deuterated molecules and their limited supply and availability. The Deuteration Network (DeuNet) is an international network of deuteration facilities and laboratories which aims to facilitate access to deuteration services and customised deuterium labelling of molecules and biomolecules for use in neutron research and in other characterisation techniques. This presentation will detail the recent advances, challenges, the demand and supply, and the impact of the bespoke deuterated compounds produced.

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