

Abstract Submission

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## **Water in wood: getting the simple things right**

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Anyone who has lived in a wooden house will know that they swell and creak (e.g. doors get jammed) with the prevailing weather conditions. What is the physio-chemical basis for those changes? Aside from the practical importance (e.g. engineering) the answer to this question may lead to important biological insights about water-polymer interactions because cellulose – the most abundant polymer – is a major component of wood. In this presentation we use experimental evidence from polymer and wood science to build up a thermodynamic view on water-wood interactions. We show how the central concept of wood and fibre science - the fibre saturation point – may be understood using traditional Gibbsian thermodynamics. This approach also leads to a straightforward understanding of the widely used concept of bound water. A key part of the insight is the importance of changes in the partial molar volume of water in water-wood mixtures. The understanding derived from studying wood-water mixtures should be quite general.