

Modulation of the hydration water around monoclonal antibodies on addition of excipients detected by terahertz-time domain spectroscopy

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Abstract

Interrogation of the protein hydration layer in the context of the rational design of high concentration monoclonal antibody (mAb) formulations has not yet been reported. Here, terahertz time domain spectroscopy (THz-TDS) was used to show that the hydration layer for 'mAb1' up to 140 mg/ml was perturbed by the addition of 200 mM proline or arginine but not 200 mM sucrose. The hydration layer of 'mAb2' was also shown to be modulated by more complex formulations composed of two or more excipients in buffer. Thus, THz-TDS promises to be a useful tool for protein formulation by providing an improved understanding of solution behaviour at high concentrations and associated mechanisms of control by the addition of excipients.