

## **Interactions of proteins on clay surfaces**

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The interaction of hen egg white Lysozyme (HEWL) with Na-saponite was examined using sorption, structural and spectroscopic methods. Three different independent methods were used to determine the amount of HEWL sorbed. The BCA assay method was used to measure the loss of protein from aqueous suspension and to determine the equilibrium concentration of protein in solution after equilibration. The amount of lysozyme sorbed on the clay surface was also measured directly by mass loss analysis using TGA and C and N analysis. All three methods provided consistent data at low to medium surface loading of protein up to a surface concentration of 400 mg of lysozyme /g of clay. Lysozyme sorption was accompanied by the release of 9.5 Na<sup>+</sup> ions for every molecule of HEWL sorbed, indicating the HEWL was sorbed predominantly through ion exchange. The d-spacing of the HEWL-saponite complex increased to a value of 4.2 nm consistent with the crystallographic dimensions of HEWL of 3 x 3 x 4.5 nm. FTIR and Raman analysis of the amide I region of the HEWL-Sap films prepared from water and D<sub>2</sub>O showed little perturbation to secondary structure of the protein. The water sorption isotherms revealed that the HEWL-Sap films were hydrophilic but the amount of water sorbed was somewhat less than that of the Na-saponite.

