Can on-surface CD shed light on the role of molecular crowding in biological monolayers?

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Molecular crowding is known to play an important role in governing conformational changes in biological molecules such as proteins and nucleic acids. It is of particular importance in environments with high molecular densities, including 2-dimensional highly packed films such as self-assembled monolayers, where molecular densities generally far exceed typical densities in solutions.
Circular dichroism (CD) is arguably one of the most commonly used non-crystallographic techniques for characterising protein conformation and conformational change in solution phase. Owing to significant improvements in instrumentation over recent years, it is now routinely possible to use CD for surface-phase studies.
Using on-surface CD spectroscopy, we have investigated the structure of a synthetic peptide assembled into a highly packed monolayer. The immobilized peptide undergoes a structural transition between α-helical and random coil conformation upon changes in pH and ionic concentration but critically, the threshold for conformational change is altered dramatically by molecular crowding within the peptide monolayer.