

**Conformational Studies of Gaseous Proteins Using Mass Spectrometry**

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Conformations of the +5 to +13 charge state of ubiquitin ions have been studied in the gas phase by an Electron Capture Dissociation (ECD) mass spectrometry (MS) technique. This approach has showed that the conformations of the gaseous ions change from the compact to extended structures as the number of protons on the protein ions increases, consistent with previous collisional cross-section measurements by an ion-mobility MS. However, this observation is in contrast to that of the solution-phase where the unique native structure is usually found. The (un)folding stability and kinetics of these gaseous ions were further investigated experimentally using gradual blackbody-radiation or sudden laser-induced thermal heating, respectively. These studies have provided the evidence that the thermodynamics and kinetics of protein (un)folding in the gas phase are quite different from those of the native aqueous proteins.