BETA-SHEET MODEL SYSTEMS IN THE GAS PHASE

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The $\beta$-sheet structure is one of the most important secondary structures in proteins. Pathogenic $\beta$-sheet structures are the reason for several diseases like BSE. In this talk different model systems are discussed which have the same structural back-bone orientation as amino acids in the peptide of a $\beta$-sheet structure. The chosen model systems contain amino acids and peptides which are protected at the $NH_2$ and COOH groups. In order to obtain the conformational orientation of the species IR/UV double resonance molecular beam experiments are performed in combination with ab initio and DFT calculations. By analyzing the NH, CH, and CO stretching vibrations structural information and intermolecular bond strengths in the $\beta$-sheet models can be derived. The investigated dimer of the protected amino acid Ac-Phe-OMe (Phe=phenylalanine, Ac=acetyl, Me=methyl) is the first example of a $\beta$-sheet model system in the gas phase. Further investigations include also the clusters of dipeptides. Especially clusters of dipeptides with template molecules are presented which are used to inhibit the growth of a pathogenic $\beta$-sheet structure. The quality of different template molecules is discussed.