ABSORPTION SPECTROSCOPY OF THE GREEN FLUORESCENT PROTEIN CHROMOPHORE IN THE GAS PHASE

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Absorption of gas-phase biomolecules has been studied at the electrostatic ion storage ring ELISA. It is demonstrated that the storage ring technique with long storage times and suitable particle detection is ideal for studies of the photo-physics of chromophores.
Here we discuss the absorption bands of the anion and cation chromophores of the Green Fluorescent Protein (GFP). We compare our gas-phase absorption measurements with absorption profiles of the protein and of chromophores in liquids. In the protein, the chromophore is covalently attached to an α-helix that runs up the axis of a hollow cylinder formed by eleven β-strands. The cylindrical shape of the rigid β-can protects the buried chromophore and it is argued that the absorption characteristics of GFP is mainly ascribed to intrinsic chemical properties of the chromophore. Absorption measurements with model chromophores of mutated GFP proteins are currently being performed in our laboratory to investigate to what extend these findings apply to other systems.