

Plasma-Induced Modification of Biomolecules: A Tool for Analysis of Protein Structures

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Abstract : Plasma-Induced Modification of Biomolecules (PLIMB) has been developed as a technology, which, together with mass spectrometry, measures three-dimensional structural characteristics of proteins. This technique uses hydroxyl radicals generated by atmospheric-pressure plasma discharge to react with the solvent-accessible side chains of protein in an aqueous solution. In this work, we investigate the three-dimensional structure of hemoglobin and myoglobin using PLIMB. Additional modifications to these proteins, such as oxidation, fragmentations, and conformational changes caused by PLIMB are also explored. These results show that PLIMB, coupled with mass spectrometry, is an effective way to determine solvent access to hemoproteins. Furthermore, we show that many factors, including pH and the electrical parameters used to generate the plasma, have a significant influence on solvent accessibility.

Keywords : plasma, hemoglobin, myoglobin, solvent access

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