Molecular structure study of dimethoxyphenyl-substituted phosphonodipeptides by infrared, Raman and surface enhanced Raman spectroscopies.

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n this study, Fourier-transform Raman (FT-RS) and infrared (FT-IR) absorption spectroscopies were employed to characterize the molecular structures of L-Ala-(3,4-dimethoxy)-L-Phe-PO_3H_2 (A) and L-Ala-(3,4-dimethoxy)-(des-CH_2)-L-Phe-PO_3H_2 (B) phosphonodipeptides, where L-Phe denotes L-phenylalanine and L-Ala, L-alanine. The vibrational band assignments have been proposed. In order to determine the structures of these dimethoxyphenyl-substituted phosphonodipeptides adsorbed on a colloidal silver surface, surface enhanced Raman spectra (SERS) were measured. The analysis of SERS band intensities showed that these dimethoxyphenyl-substituted phosphonodipeptides directly interacted with the silver surface through the aromatic ring of Phe that adopted an orientation almost perpendicular to the silver surface. We also showed that intense enhancement of the $\nu_{as}(NH_2)$, $\delta_{as}(PO_3^{2-})$, and $\nu(P\rfloor O)$ modes of L-Ala-(3,4-dimethoxy)-L-Phe-PO_3H_2 suggested that these groups were mainly involved in the interaction with the silver colloid. Additionally, we proved that in the SERS spectrum of L-Ala-(3,4-dimethoxy)-(des-CH_2)-L-Phe-PO_3H_2, several vibrations of the $\rfloor CH_3$ group were enhanced, indicating a flattened orientation of the peptide backbone on the silver surface.

Adres publiczny

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