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Aqueous Cations and Excess of Translational Vibrations as the Evidences of Charge Transport in Biomaterials

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In this study, the terahertz-infrared spectra of extracellular matrix and filaments of *S. oneidensis* bacteria, bovine heart cytochrome *c* and bovine serum albumin were examined by means of Fourier-transform infrared spectroscopy technique. The absorption lines of water and aqueous cations hydronium H_3O^+ and Zundel H_5O_2^+ were detected, of the highest intensity in the bacteria extracellular matrix and filaments samples and of the lowest intensity in the albumin samples. We demonstrate that there exists correlation between spectral signatures of aqueous cations and charge transport signs in the investigated materials, which sheds light on the mechanisms of charge transfer.