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Title:	Modification of Enzyme Activity by Vibrational Strong Coupling of Water
Authors:	George, J. (/jspui/browse?type=author&value=George%2C+J.)
Keywords:	Enzymes Light-matter strong coupling Optical cavities Vibrational spectroscopy Water
Issue Date:	2019
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Citation:	Angewandte Chemie - International Edition, 58(43), pp.15324-15328.
Abstract:	Vibrational strong coupling (VSC) has recently emerged as a completely new tool for influencing chemical reactivity. It harnesses electromagnetic vacuum fluctuations through the creation of hybrid states of light and matter, called polaritonic states, in an optical cavity resonant to a molecular absorption band. Here, we investigate the effect of vibrational strong coupling of water on the enzymatic activity of pepsin, where a water molecule is directly involved in the enzyme's chemical mechanism. We observe an approximately 4.5-fold decrease of the apparent second-order rate constant k_{cat}/K_m when coupling the water stretching vibration, whereas no effect was detected for the strong coupling of the bending vibration. The possibility of modifying enzymatic activity by coupling water demonstrates the potential of VSC as a new tool to study biochemical reactivity.
Description:	Only IISERM authors are available in the record.
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