



# Library Indian Institute of Science Education and Research Mohali



**DSpace@IISERMohali (/jspui/)**  
**/ Publications of IISER Mohali (/jspui/handle/123456789/4)**  
**/ Research Articles (/jspui/handle/123456789/9)**

Please use this identifier to cite or link to this item: <http://hdl.handle.net/123456789/1941>

Title:	Cavity Catalysis by Cooperative Vibrational Strong Coupling of Reactant and Solvent Molecules†
Authors:	Lather, J. (/jspui/browse?type=author&value=Lather%2C+J.) Bhatt, P. (/jspui/browse?type=author&value=Bhatt%2C+P.) George, J. (/jspui/browse?type=author&value=George%2C+J.)
Keywords:	Vibrational strong Cooperative Molecules Magnitude
Issue Date:	2019
Publisher:	Wiley Online Library
Citation:	Angewandte Chemie - International Edition, 58(31), pp.10635-10638.
Abstract:	Here, we report the catalytic effect of vibrational strong coupling (VSC) on the solvolysis of para-nitrophenyl acetate (PNPA), which increases the reaction rate by an order of magnitude. This is observed when the microfluidic Fabry–Perot cavity in which the VSC is generated is tuned to the C=O vibrational stretching mode of both the reactant and solvent molecules. Thermodynamic experiments confirm the catalytic nature of VSC in the system. The change in the reaction rate follows an exponential relation with respect to the coupling strength of the solvent, indicating a cooperative effect between the solvent molecules and the reactant. Furthermore, the study of the solvent kinetic isotope effect clearly shows that the vibrational overlap of the C=O vibrational bands of the reactant and the strongly coupled solvent molecules is critical for the catalysis in this reaction. The combination of cooperative effects and cavity catalysis confirms the potential of VSC as a new frontier in chemistry.
Description:	Only IISERM authors are available in the record.
URI:	<a href="https://onlinelibrary.wiley.com/doi/full/10.1002/anie.201905407">https://onlinelibrary.wiley.com/doi/full/10.1002/anie.201905407</a> ( <a href="https://onlinelibrary.wiley.com/doi/full/10.1002/anie.201905407">https://onlinelibrary.wiley.com/doi/full/10.1002/anie.201905407</a> ) <a href="http://hdl.handle.net/123456789/1941">http://hdl.handle.net/123456789/1941</a> ( <a href="http://hdl.handle.net/123456789/1941">http://hdl.handle.net/123456789/1941</a> )
Appears in Collections:	Research Articles (/jspui/handle/123456789/9)

Files in This Item:

File	Description	Size	Format
Need to add pdf.odt (/jspui/bitstream/123456789/1941/1/Need%20to%20add%20pdf.odt)		8.63 kB	OpenDocument Text

[View/Open \(/jspui/bitstream/123456789/1941/1/Need%20to%20add%20pdf.odt\)](#)

[Show full item record \(/jspui/handle/123456789/1941?mode=full\)](#)

[Statistics \(/jspui/handle/123456789/1941/statistics\)](#)

Items in DSpace are protected by copyright, with all rights reserved, unless otherwise indicated.