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A curvature-tunable random laser

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研究重點

We investigate the case that the transport mean free path of emitted photons within the disordered scatters, which is composed by the ZnO nanowires, is tunable by a curvature bending applied on the flexible polyethylene terephthalate (PET) substrate underneath, which is able to be operated above and below the lasing threshold for desirable spectral emissions. The developed curvature-tunable random laser, for the first time, is implemented for in vivo biological imaging with much lower speckle noise when compared to the non-lasing situation through a simple mechanical bending, which is of great potential for studying the fast-moving physiological phenomenon like blood flow patterns in mouse's ear skins. We expect the experimental demonstration on the curvature-tunable random laser can open up a new route towards developing disorder based optoelectronic devices such as the in vivo speckle contrast imaging, the strain-gauge sensor, and the wearable gadget of personal healthcare.

研究成果

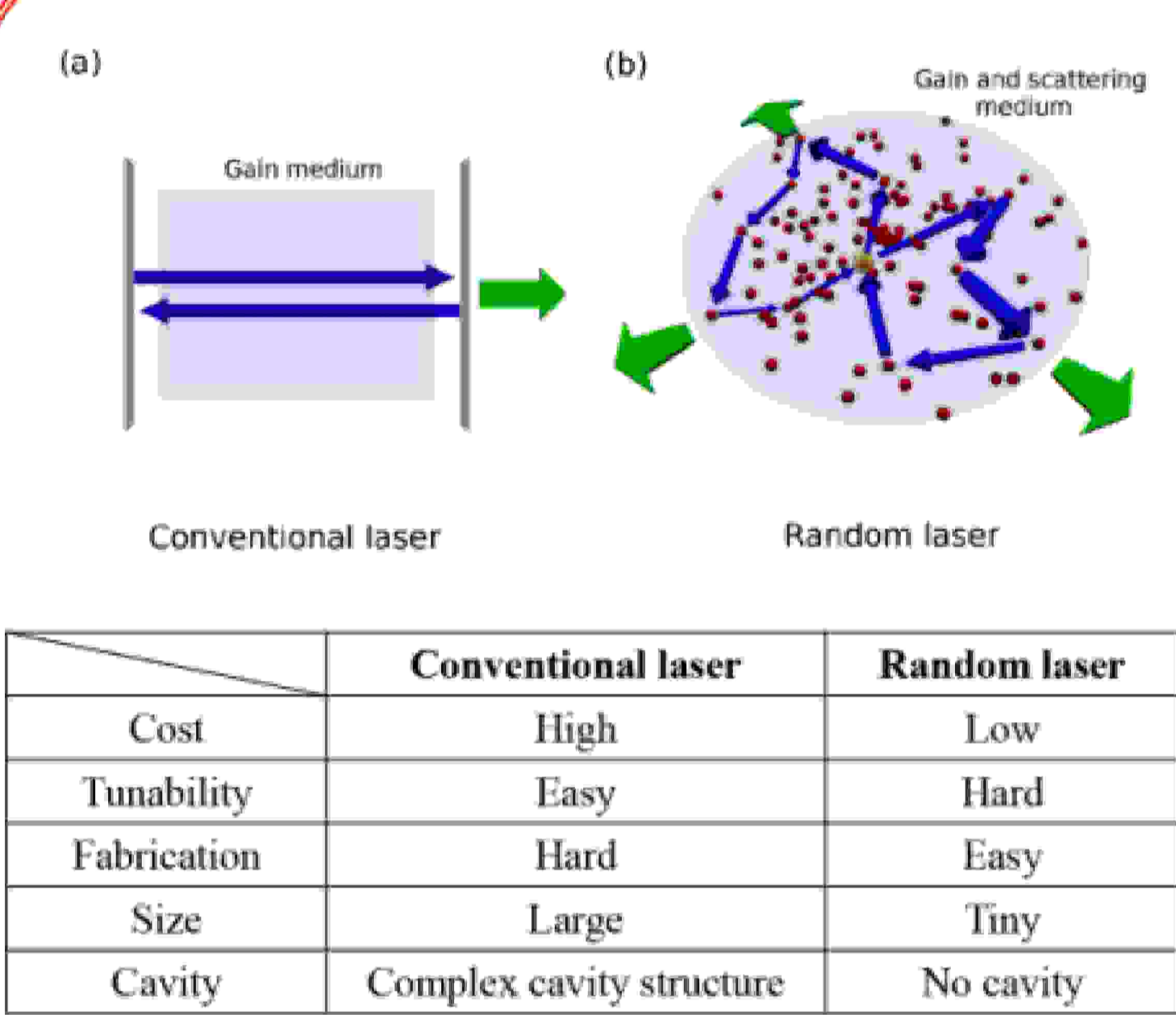
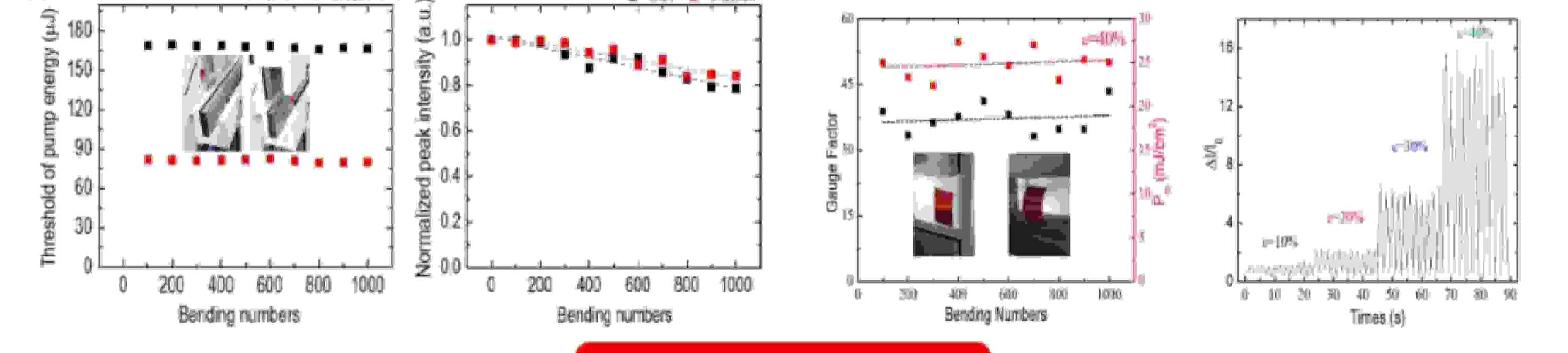
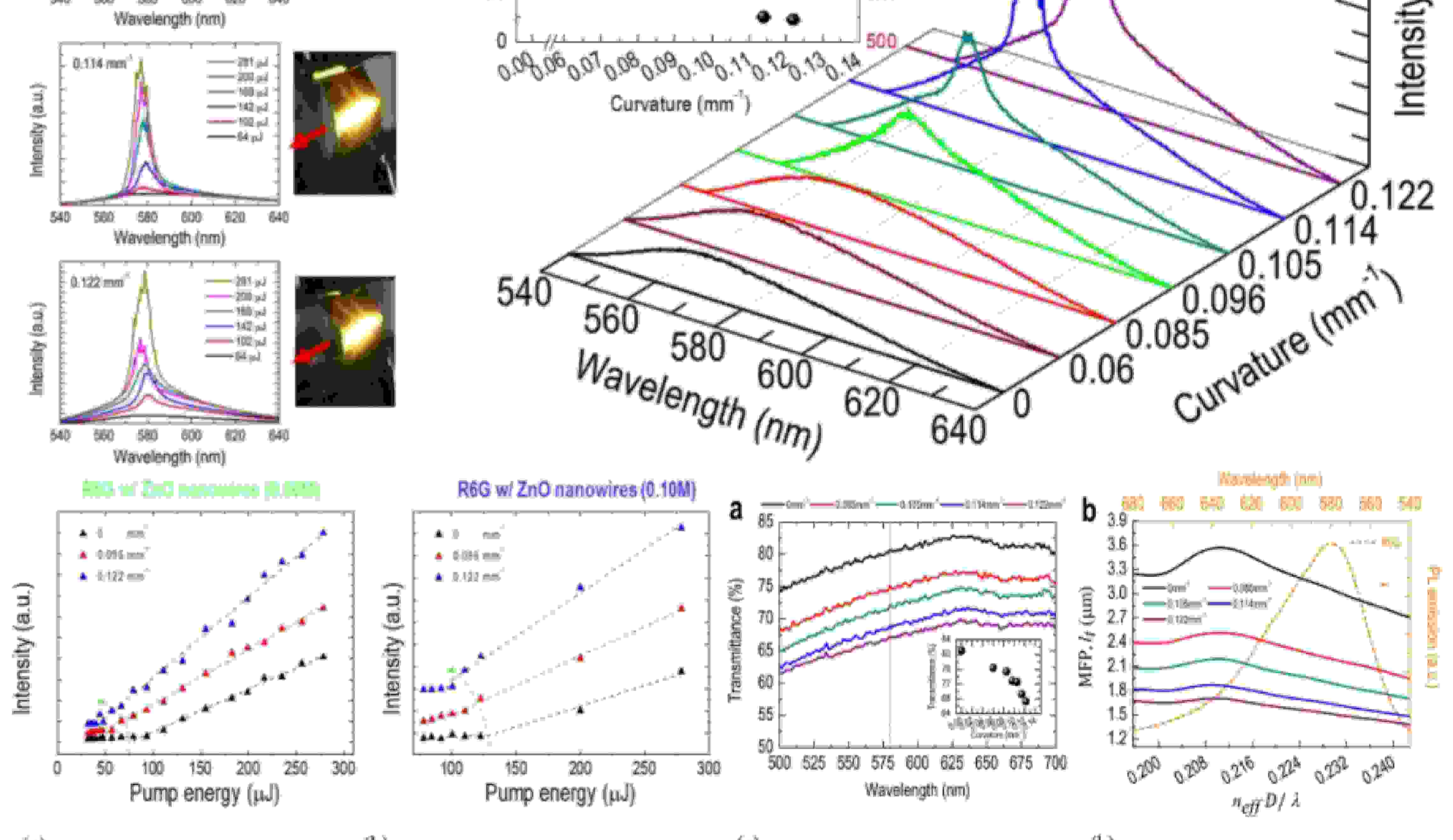
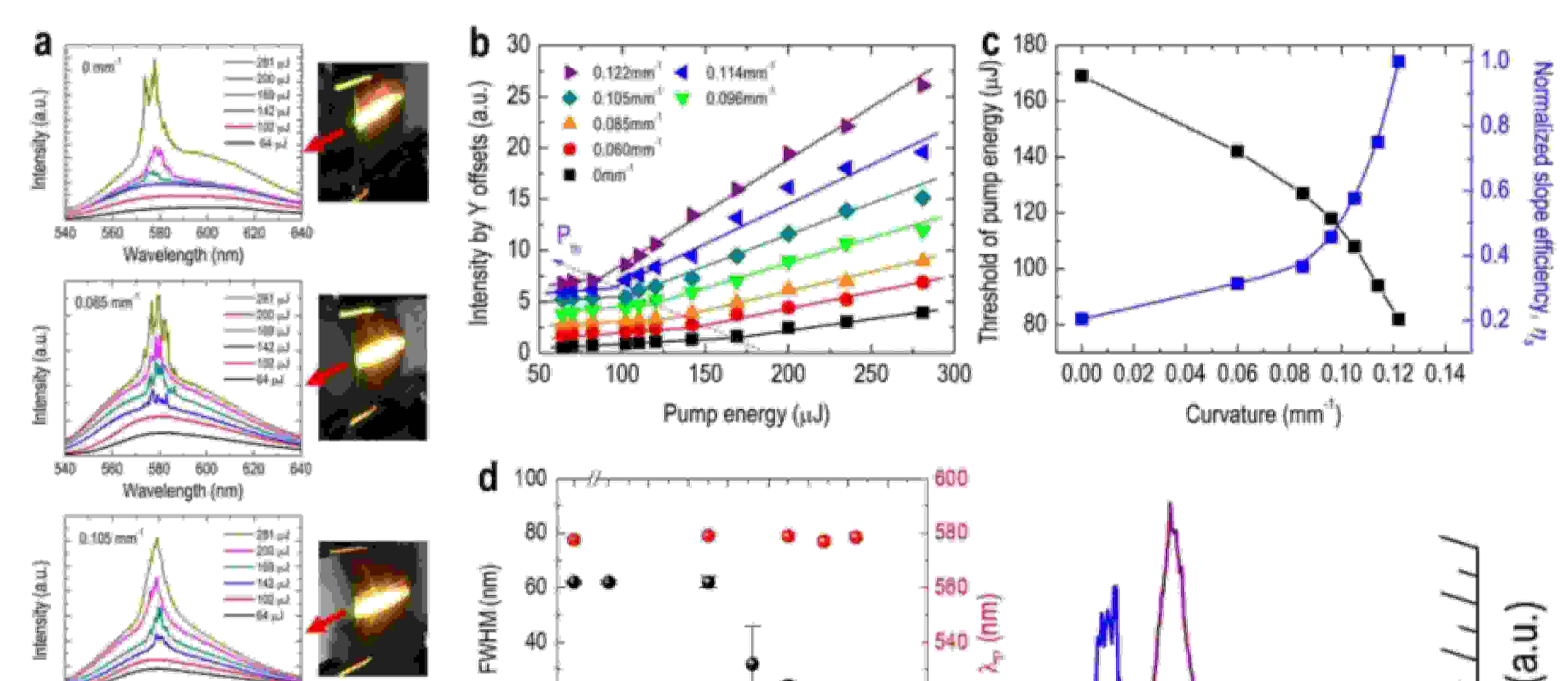
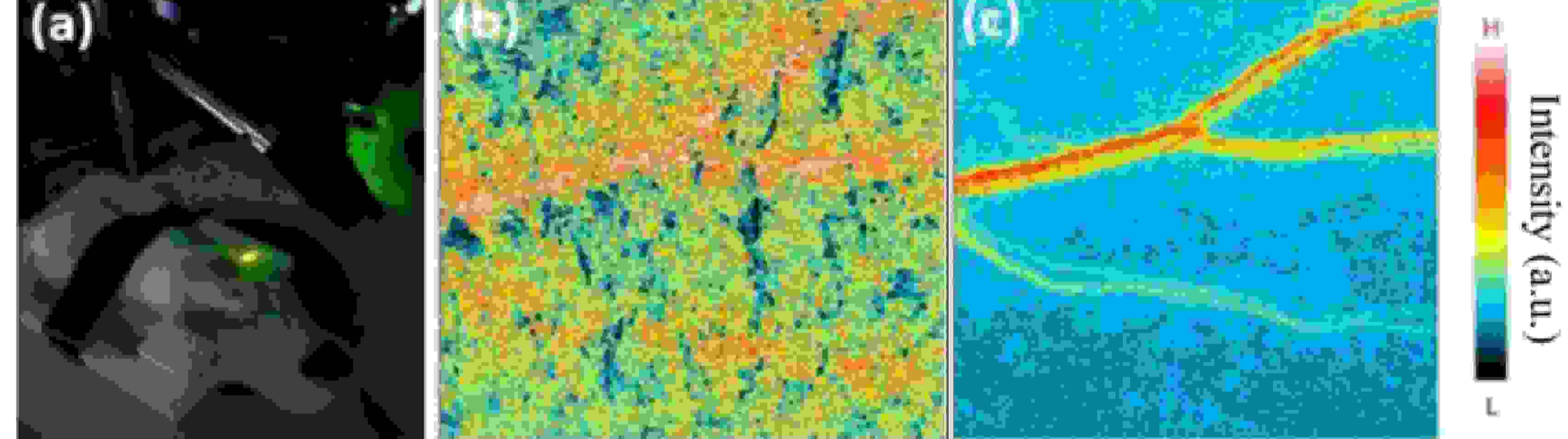
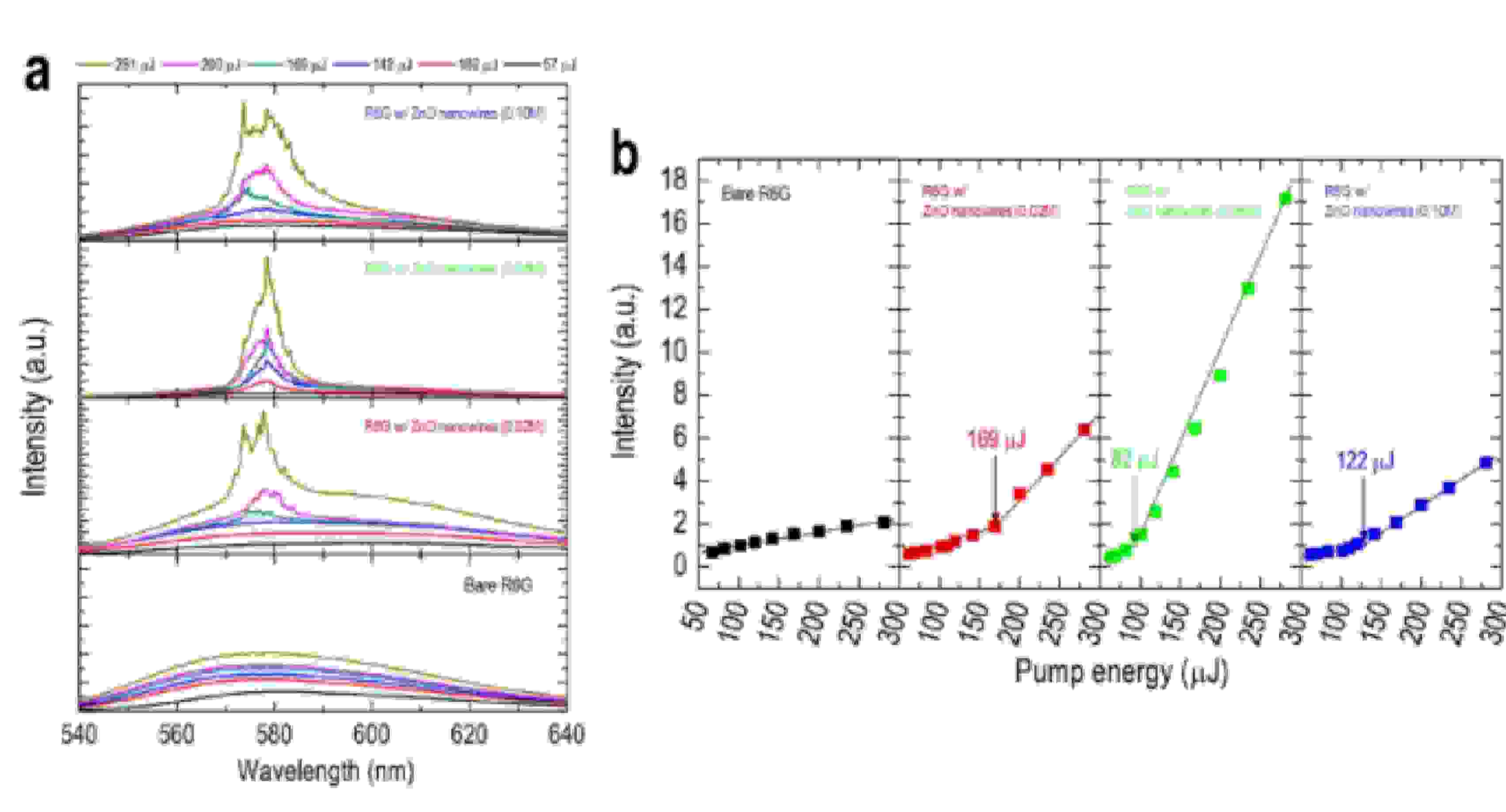
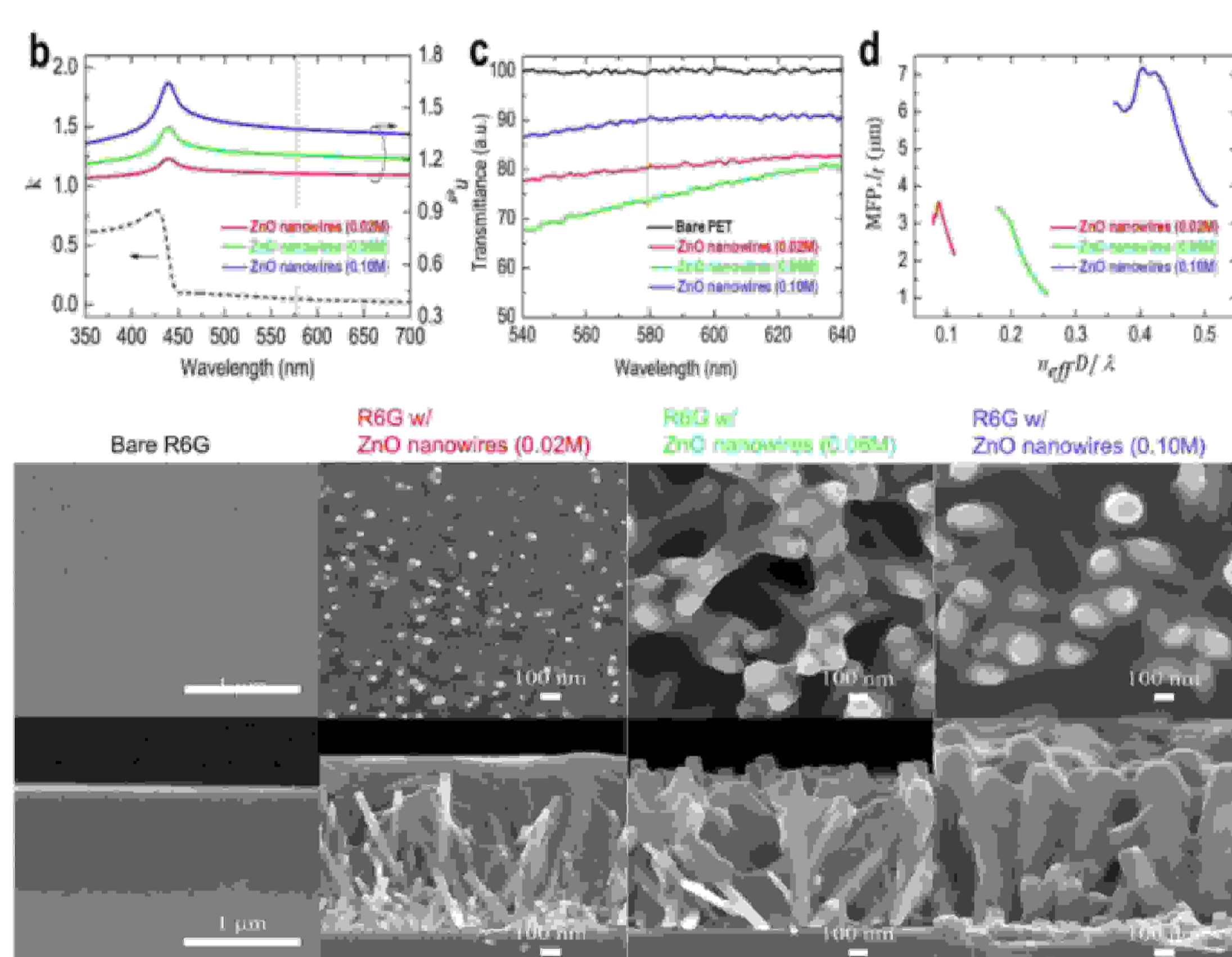
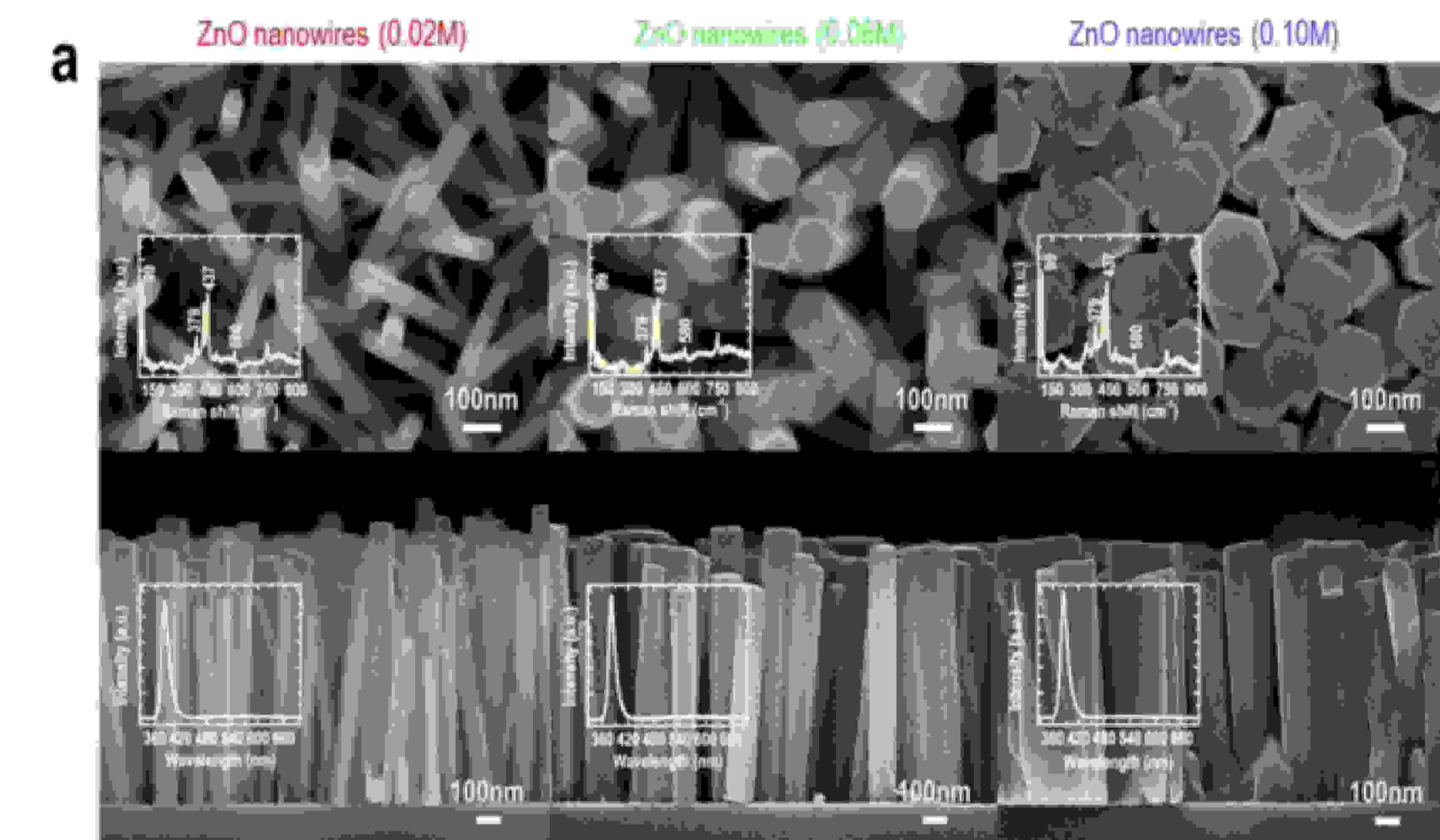
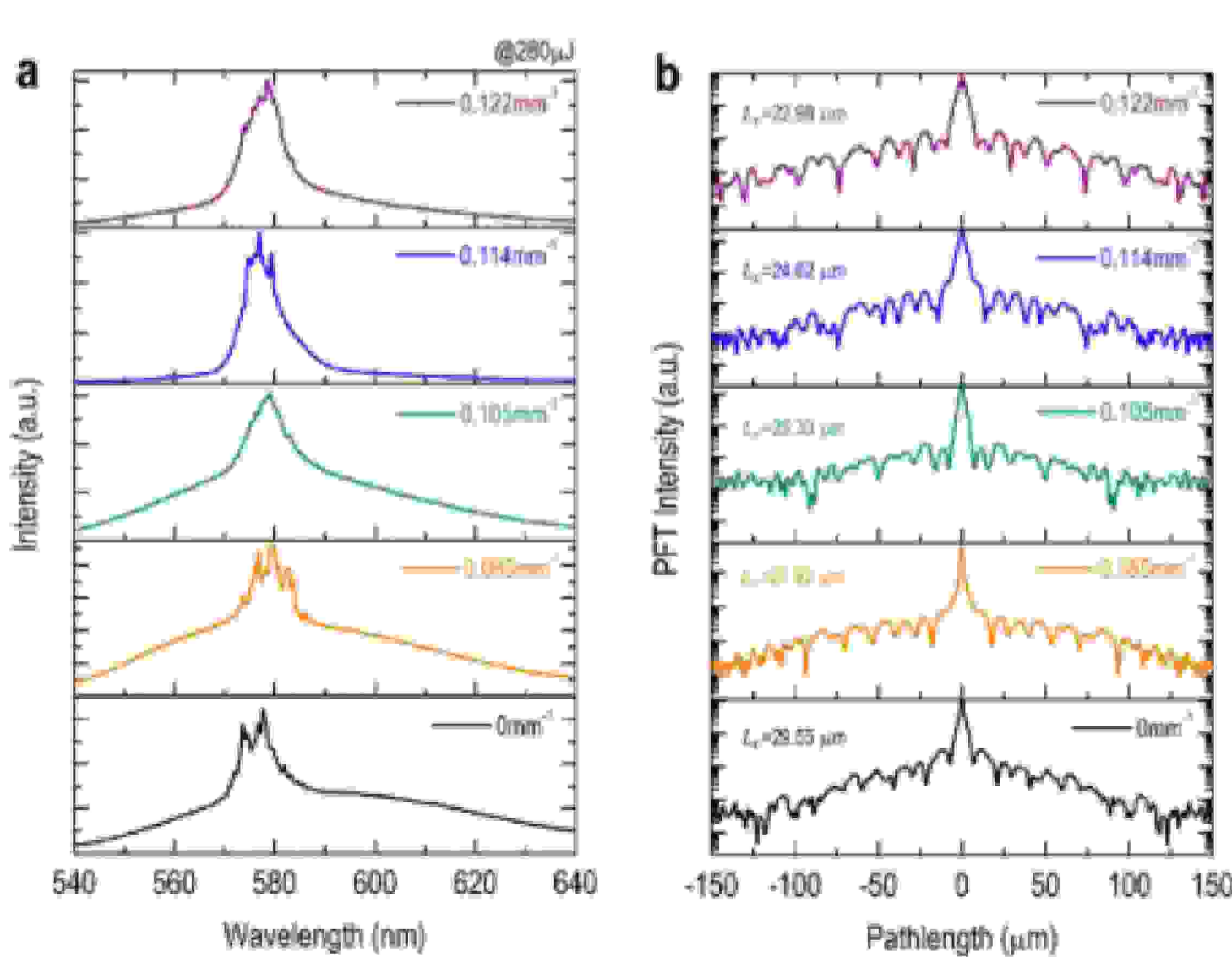
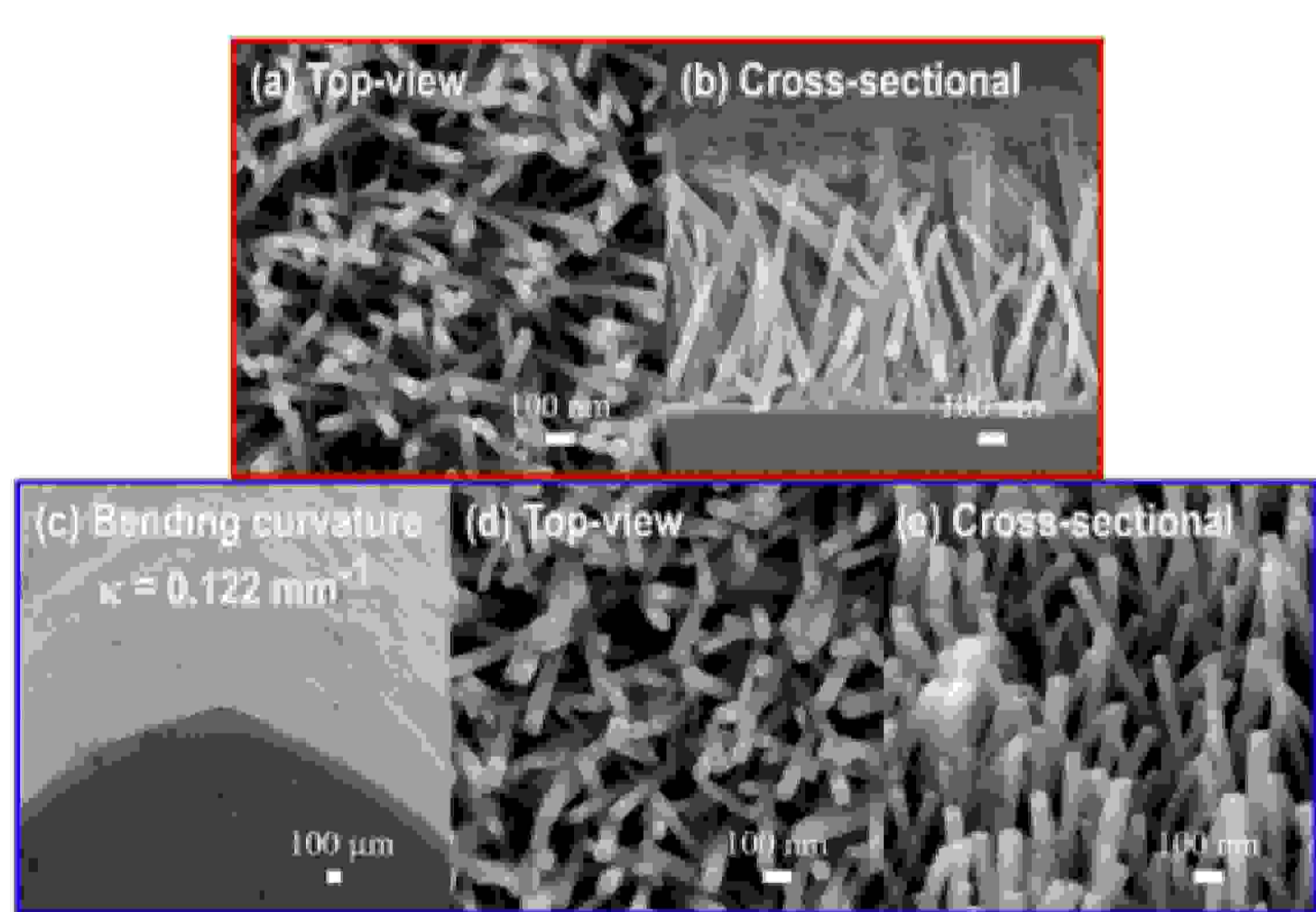
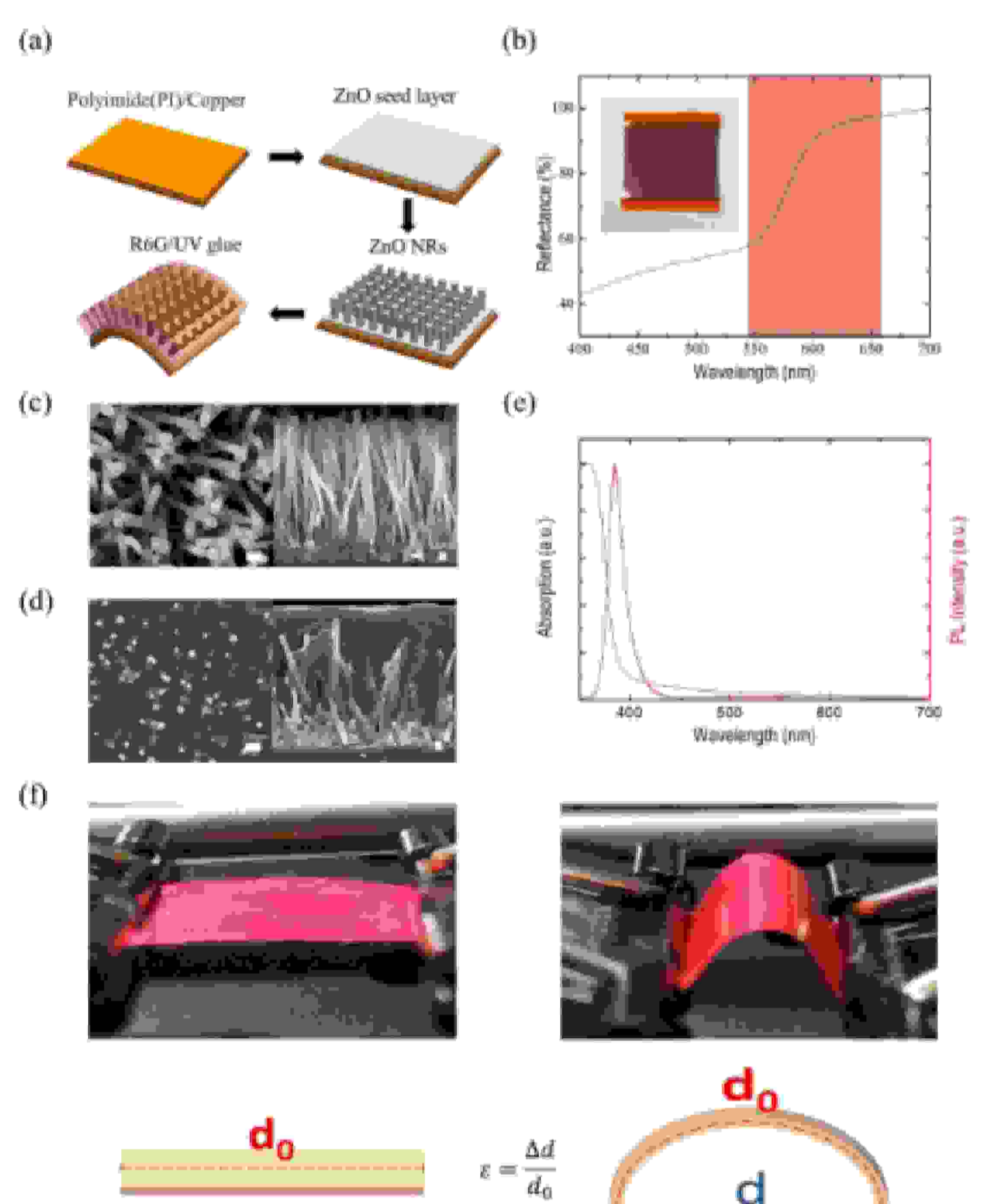


Image courtesy of A. Douglas Stone research group, Yale University.



研究生活及心得

這短短幾年的研究生涯，每個題目都遇到了許多困難，透過不斷的閱讀期刊來思考並創新，藉由學習新的技術及軟體來自我提升，測試了無數的參數，克服了一個又一個問題，最終才能完成這些期刊的投稿。其中除了我自己的努力，還需要感謝許多人的幫忙，首先要感謝我的指導教授—李亞儒教授，這幾年提供我許多大大小小的機會去參加各個國內、外研討會，而且也幫我爭取了許多獎學金及補助，除了教授我許多寶貴的知識，也給了我很多目標及方向，讓我的研究能又深又廣。另外，我也要感謝我的學長姐們，一路上教導了我許多實驗上的細節，不斷的跟我討論實驗內容，逐漸培養我研究及分析的能力，也讓我日後帶領學弟妹能更得心應手。我也要感謝我的同學跟學弟妹們，如果沒有你們實驗上的幫忙，我沒辦法如此順利完成學位，也因為有你們才能讓我教學相長，除了讓我了解我的不足也讓我更有能力教導其他人。最後感謝我的家人，這些年的無私奉獻，默默支持我讓我能無後顧之憂地完成學位。另外特別感謝中技社，提供了豐厚的獎學金，給予了許多像我一樣的研究生實質的支持及鼓勵，感謝所有評審委員的肯定，我將抱持感恩的心並更致力於研究，也會將我的經驗傳承給我的學弟妹，並期許自己在可見的未來，能貢獻所學為學術研究或科技工程等方面盡一份心力以回饋社會。

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