Electronic Supplementary Material (ESI) for Physical Chemistry Chemical Physics.


**Electric Supplementary Information**

# Plasmon-Mediated Chemical Transformation from Alkane to Alkene on Silver Nanoparticle Array under 532 nm Excitation

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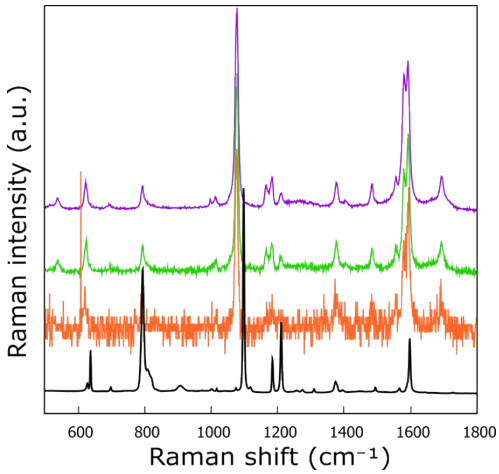
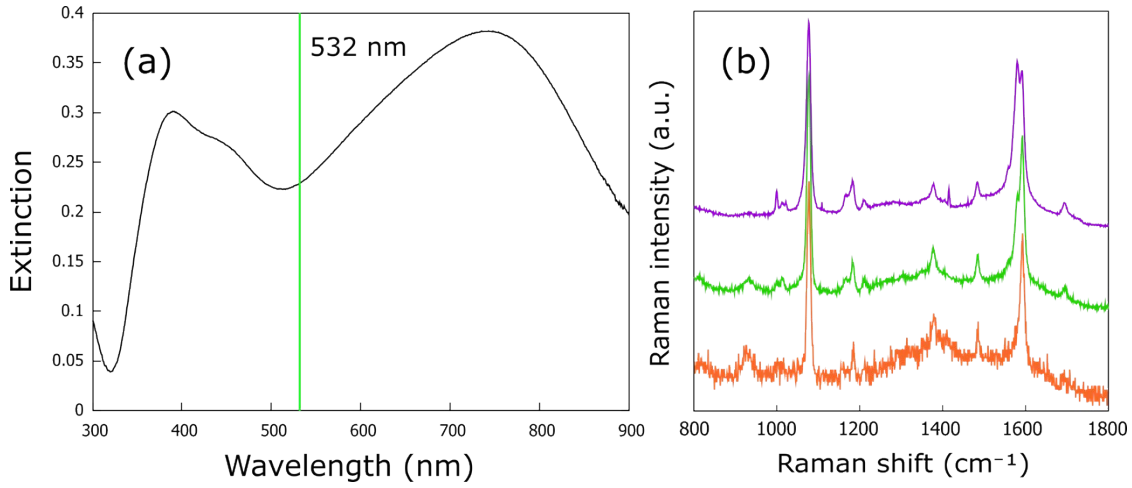
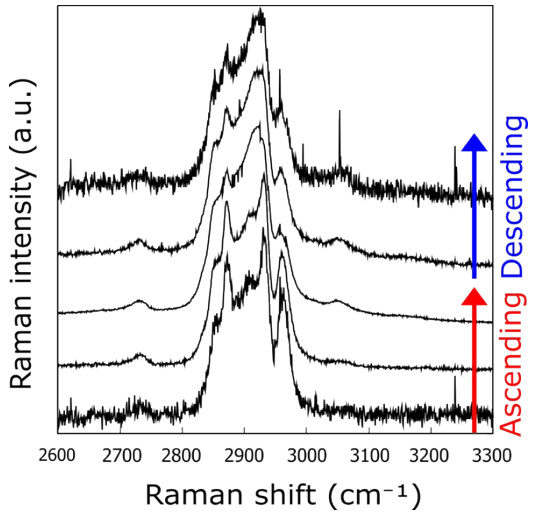


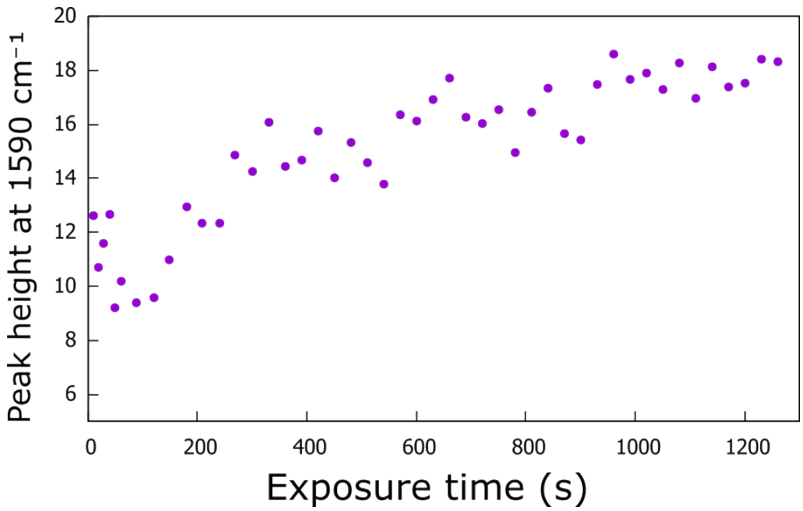

SFigure 1. Normal Raman (black) and SERS spectra of *p*-MT measured at different position at the laser intensities of 4 (orange), 40 (green) and 400 (purple) W/mm$^2$ in the sample observed in Fig. 2. Ethanol was dried, and the measurements were performed under atmospheric condition. The Raman peaks from Ph-CO and CO were similarly observed.



SFigure 2. (a) Extinction spectrum of AgNP array used for "off-resonant" SERS measurement. The extinction peak was around 750 nm. (b) SERS spectrum of *p*-MT measured under "off-resonant" condition. 532 nm excitation was illuminated on *p*-MT on the AgNP array shown in SFig. 2(a). The laser intensities were 4 (orange), 40 (green) and 400 (purple) W/mm$^2$. The chemical transformation was not clearly observed at 4 W/mm$^2$ although the peaks were observed at 1580 and 1690 cm$^{-1}$ at the same intensity in SFig. 1. This is due to the less coupling efficiency as plasmons in the case of "off-resonant" condition.




SFigure 3. SERS spectra (2600-3300 cm$^{-1}$) of 1-BT measured at ascending the laser intensity of 4, 40 and 400 W/mm$^2$, afterwards, descending the laser intensity of 40 and 4 W/mm$^2$. The measuring time was 150 s, and the cumulated number is 2.




SFigure 4. Growth of Raman peak at 1590 cm$^{-1}$ with exposure time. The laser intensity was 185 W/mm$^2$. Each measuring time was 10 s until 60 s and 30 s from 60 s to 1260 s.