Supporting information:

An investigation of the effect of high-pressure on charge transfer in dye-sensitized solar cells based on surface-enhanced Raman spectroscopy

Lin Zhu[1,a], Peng Li[1,4,a], Huanhuan Sun[3], Xiaoxia Han[1], Yitong Xu[1], Xiaolei Wang[1], Bingbing Liu[3], Yukihiro Ozaki[2] and Bing Zhao[1*]

[1]*Stake Key Laboratory of Supramolecular Structure and Materials, Jilin University, Changchun 130012, China*

[2]*School of Biological and Environmental Sciences, Kwansei Gakuin University, Sanda, Hyogo 669-1337, Japan*

[3]*State Key Lab Superhard Materials, Jilin University, Changchun 130012, China*

[4]*Weichai Power Co.,Ltd*

[*]Corresponding author.

E-mail: zhaob@jlu.edu.cn

[a] These authors have equal contribution to the study.

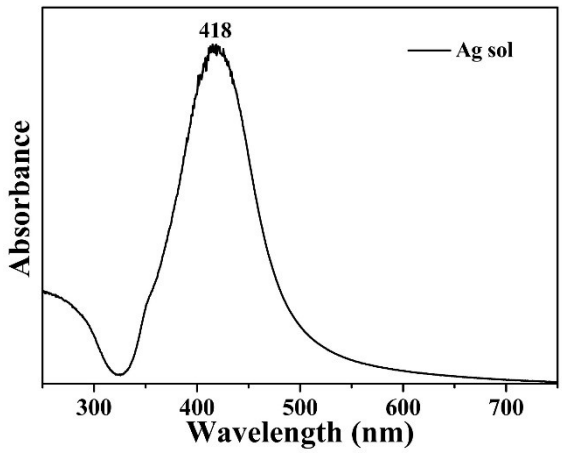

Figure S1. UV-Vis sbsorption spectra of Ag NPs.

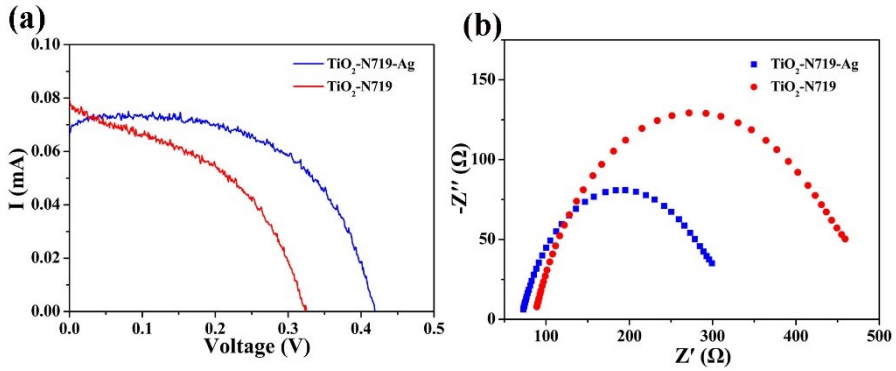

Figure S2. The photocurrent-voltage (I-V) curves (a) and impedance spectra (b) for the TiO_2@N719 and TiO_2@N719@Ag systems.

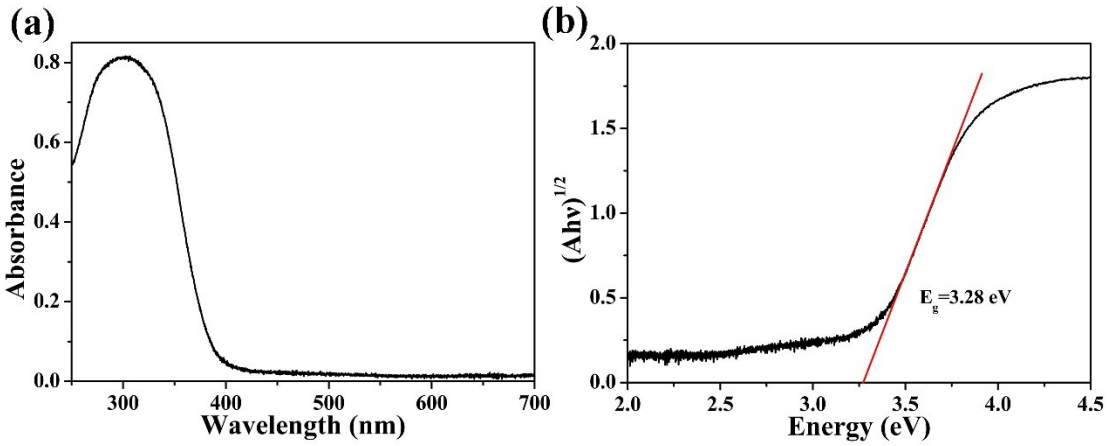

Figure S3. (a) UV-Vis sbsorption spectra of TiO_2 NPs. (b) Relationship between $(Ahv)^{1/2}$ and photon energy (hv) for TiO_2 NPs.

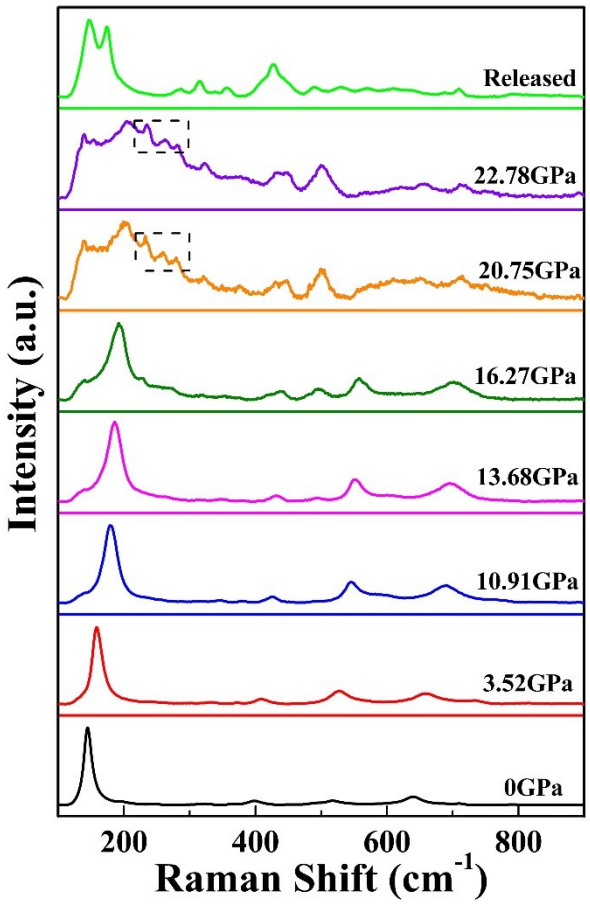

Figure S4. Raman spectra of TiO_2 NPs obtained under high pressure.

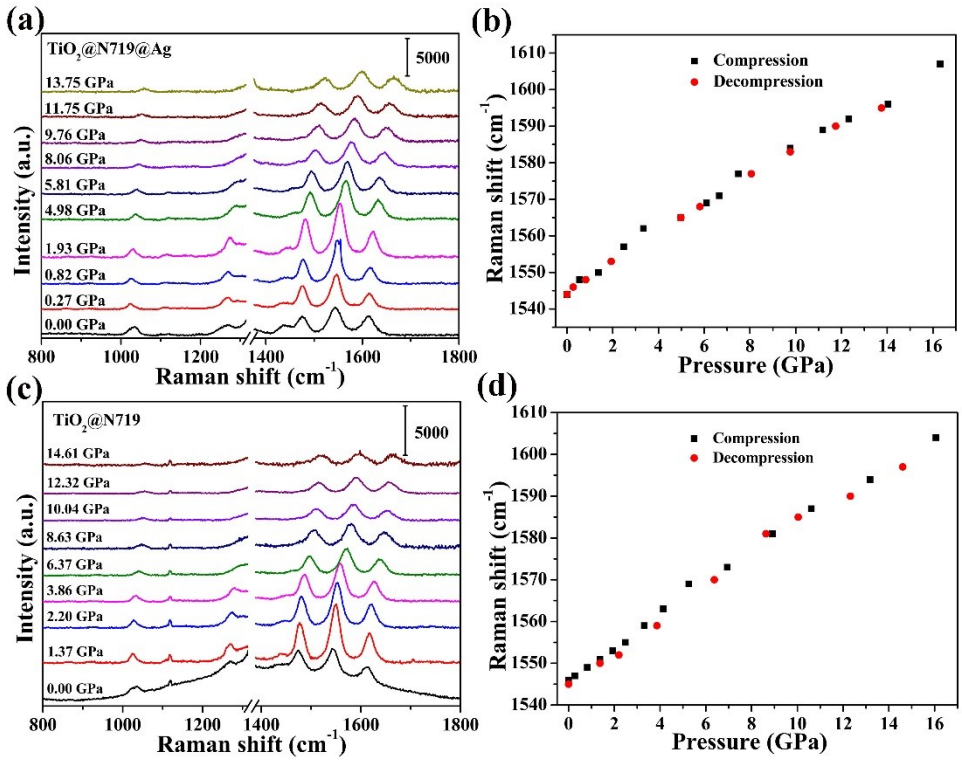

Figure S5. High pressure SERS spectra of (a) TiO_2@N719@Ag system and (c) TiO_2@N719 measured during decompression experiment. Plots of frequencies of the band at 1544 cm^{-1} versus the pressure upon compression and decompression of (b) TiO_2@N719@Ag system and (d) TiO_2@N719.

Table S1. Raman Shifts and Assignments of N719 molecule in the TiO_2@N719 and TiO_2@N719@Ag system.[a]

N719	TiO_2@N719	TiO_2@N719@Ag	Assignments
1019	1036	1024	Ring breathing (bpy)
1268	1271	1270	ν(C=N) (bpy) + ν(C-C) intern-ring (bpy)
1300		1313	ν(C-C) intern-ring (bpy) + ν(C=N) (bpy)
	1365	1365	ν_s(COO-)
1427	1437	1430	ν(C=N) (bpy)
1470	1475	1473	ν(C=N) (bpy)
1540	1545	1538	ν(C=C) (bpy)
1605	1613	1608	ν(C=C) (bpy)
2096	2114	2146	ν(C=N) (SCN)

[a] *ν=stretching, δ=deformation.*