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Supporting Information

Au nanorods-sensitized 1DPC for visible detection of NIR light

*Huaizhong Shen, Yuxin Wu, Wenjing Wang, Hongyang Su, Wendong Liu, Junhu Zhang, Kai Zhang *, and Bai Yang*

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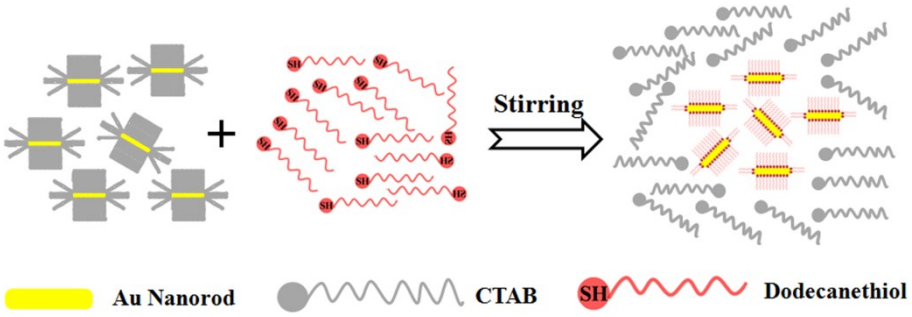

Fig. S1 Schematic illustration of the Au nanorods phase transfer from water to organic solvents.

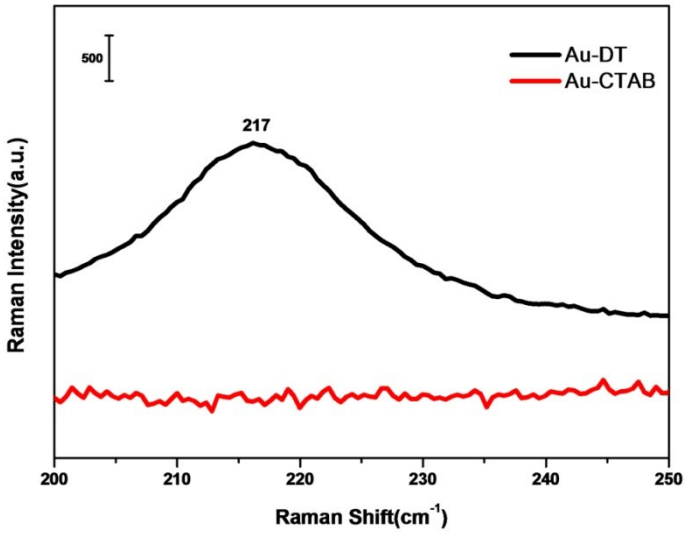

Fig. S2 Raman spectra of the Au nano rods before phase transfer (red) and after phase transfer (black). The peak in wavenumber 217 indicates the combination of Au and sulfur.

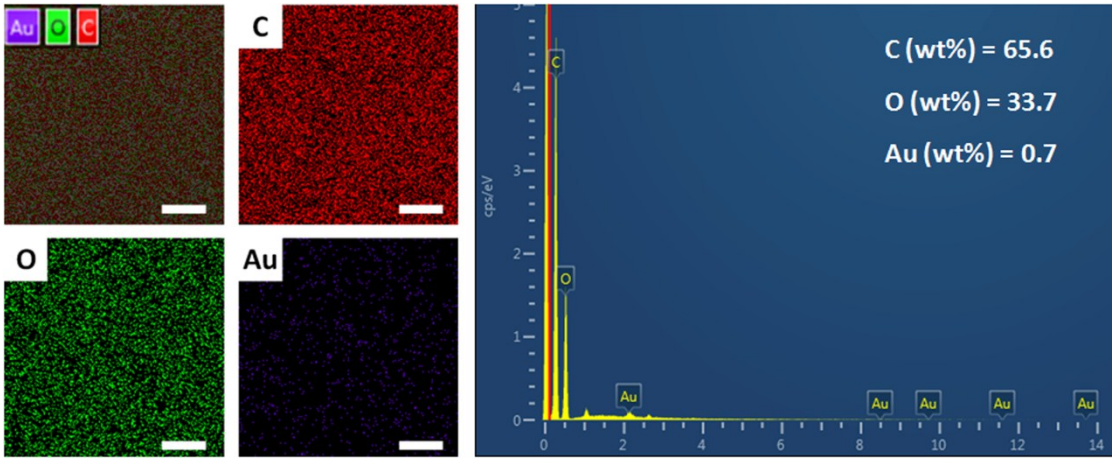

Fig. S3 EDS test on the Au/PMMA hybrid thin film. The film is made by spin coating precursor solution containing 1 mL Au NRs solution and 10 mL PMMA (30 mg/mL). The scale bar represent 100 micrometers.

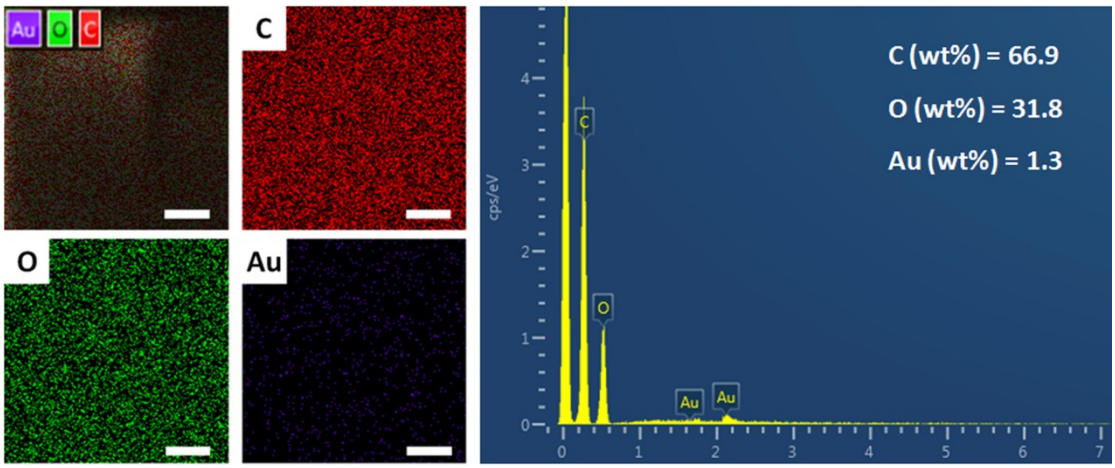

Fig. S4 EDS test on the Au/PMMA hybrid thin film. The film is made by spin coating precursor solution containing 2 mL Au NRs solution and 10 mL PMMA (30 mg/mL). The scale bar represent 100 micrometers.

To verify the constituent element of the hybrid films, we took SEM EDS test on the Au/PMMA hybrid film. The results are shown in the following figures. The main elements in the hybrid film are C, O and Au, indicating that the film is composed of PMMA and Au NRs after the solvents evaporation. The mapping results show that all the three main elements are distributed uniformly. The weight percent of Au is 0.7% and 1.3% respectively in films made from precursor solution containing different Au NRs. However, the Au content is lower when compared with the theoretical calculation. Since the concentration of Au NRs solution is described by the mass of Au atoms (3.9338 mg/mL), the theoretical Au content in the hybrid film is calculated as 1.3% and 2.5%. The loss of Au content happened mainly in following three steps. First is the synthesis of Au NRs, even though it has a very high conversion rate (ref. 30), it cannot reach 100 percent. Second is the post-processing step containing several times of centrifugation. Third is the phase transfer step, which contains ligands transfer and centrifugation.

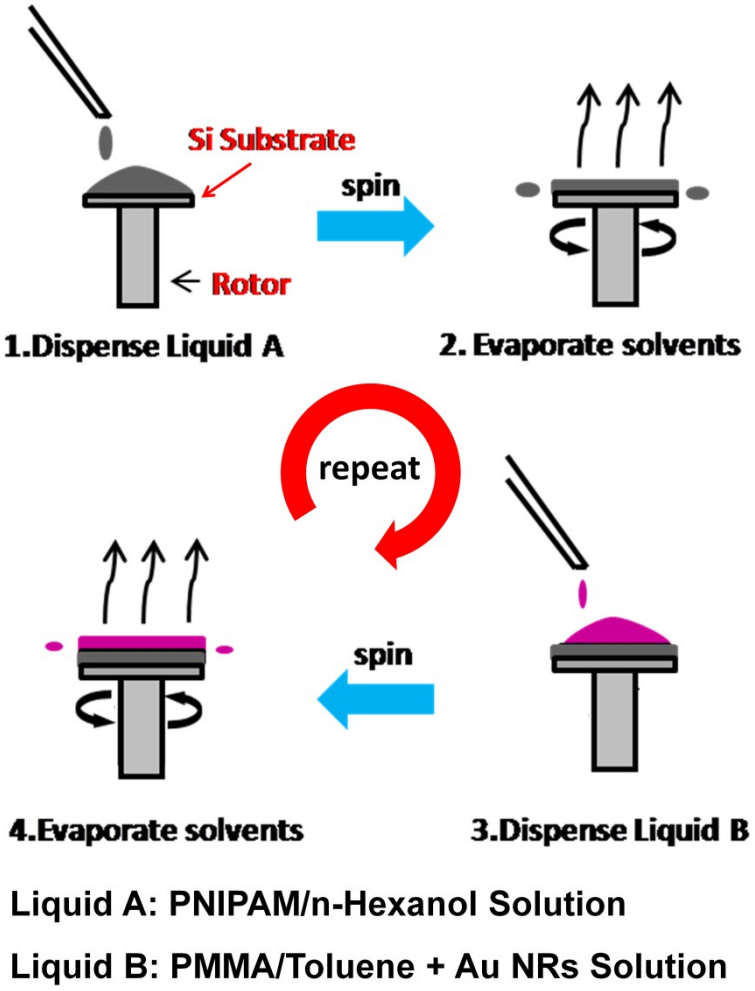

Fig. S5 Schematic illustration of fabrication process of IR sensitive one dimensional photonic crystal.

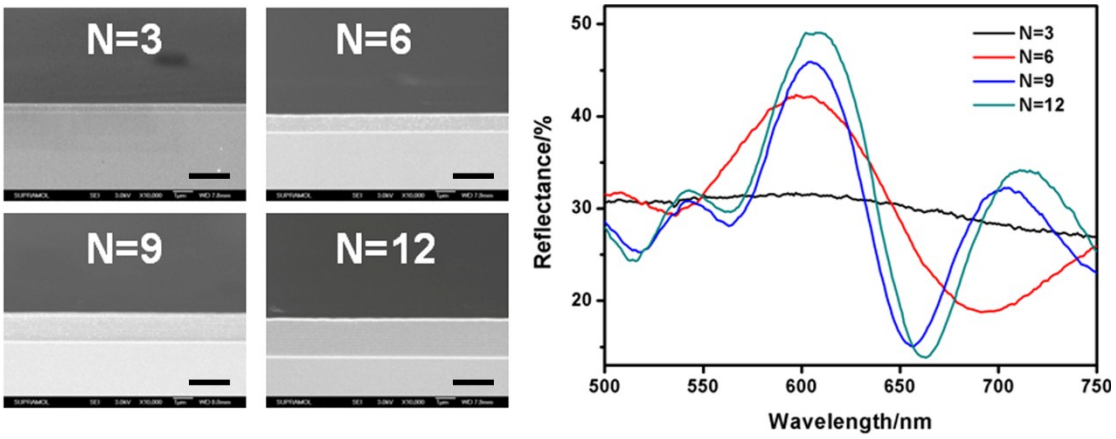

Fig. S6 Cross sectional SEM images and reflectance spectra of samples consisting of 3, 6, 9, and 12 bi-layers, scale bars all represent 2 μ m.

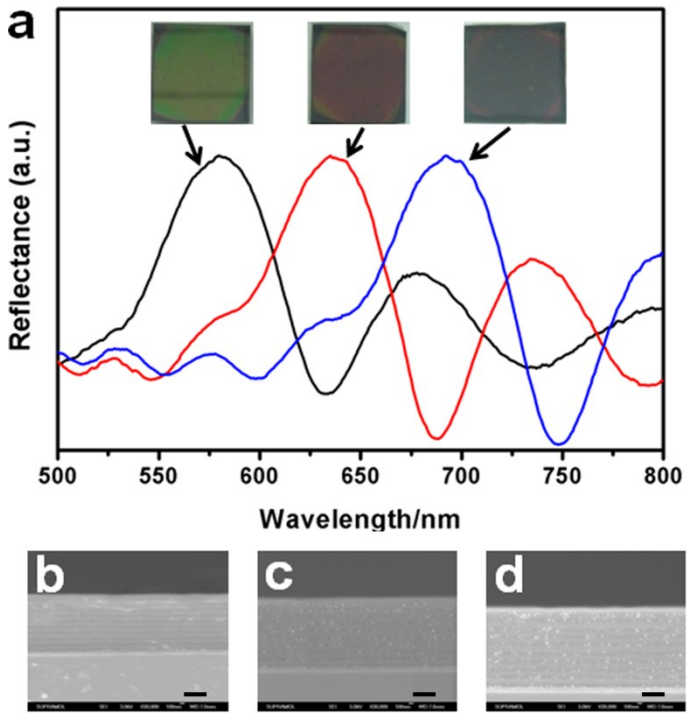

Fig. S7 (a) Reflectance spectra and corresponding photographs of samples with layers of different thickness. (b), (c) and (d) are SEM images of the three samples, scale bars all represent 0.5 μm.

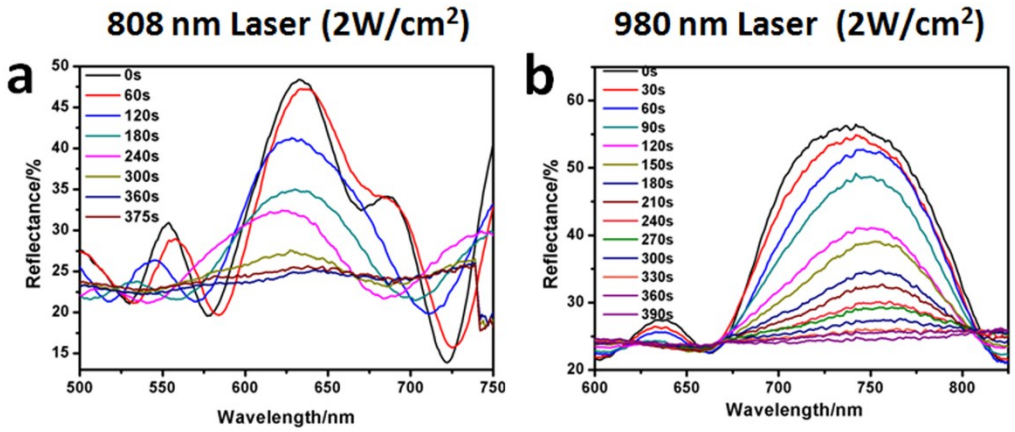

Fig. S8 (a) Reflectance spectra of sample exposed to 808 nm IR irradiation with different time. (b) Reflectance spectra of sample exposed to 980 nm IR irradiation with different time. All the samples are built with pure polymer of PMMA and PNIPAM without Au nano-rods.

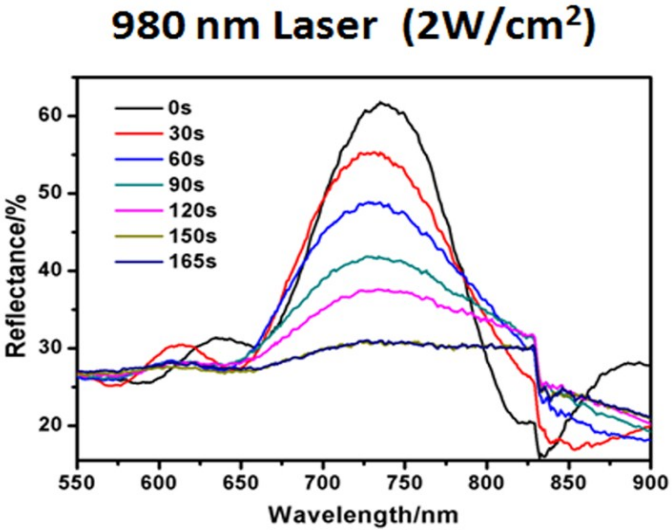

Fig. S9 Reflectance spectra of 1DPC doped with Au nano-rods (Absorbance centered at 942 nm) exposed to 980 nm laser with different time.

Table S1. System temperature recorded during IR irradiation process.

	Origin [°C]	30s [°C]	60s [°C]	90s [°C]	120s [°C]	150s [°C]	180s [°C]
Non-Au/IR-808nm	17.7	18.5	19.7	20.8	21.5	22.3	23.9
Non-Au/IR-980nm	17.7	18.3	19.8	21.0	22.4	23.1	24.3
Au-800nm/IR-808nm	17.7	18.8	22.3	26.7	30.1	34.9	37.7
Au-942nm/IR-980nm	17.7	18.7	21.9	25.6	30.2	34.5	38.1
Au-800nm/IR-980nm	17.7	18.3	19.7	21.4	23.3	25.8	28.5

（continued）

	210s [°C]	240s [°C]	270s [°C]	300s [°C]	330s [°C]	360s [°C]	390s [°C]
Non-Au/IR-808nm	25.5	26.4	27.6	28.4	30.2	31.7	33.7
Non-Au/IR-980nm	25.8	26.7	27.4	28.7	30.4	32.1	33.2
Au-800nm/IR-808nm	--	--	--	--	--	--	--
Au-942nm/IR-980nm	--	--	--	--	--	--	--
Au-800nm/IR-980nm	31.2	34.1	36.8	--	--	--	--