## -Supporting Information-

## Manipulation on ZnO heterostructures: from binary ZnO-Ag to

## ternary ZnO-Ag-polypyrrole

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Figure S1. TEM images of ZnO-Ag without PVP.



Figure S2. XRD pattern of the product synthesized in the absence of water.



Figure S3. TEM images of the product in the absence of water.





**Figure S4.** The typical time-dependent evolution of UV–vis absorption spectra of MB solution using ZnO (a); ZnO-Ag (b); ZnO-Ag-PPy (c) as catalysts under UV light.



**Figure S5.** The relationship between  $-\ln(C_t/C_0)$  versus time of photodegradation of MB under UV light (a), and visible light (b) of different products.



**Figure S6.** The cycling runs for the degradation of MB of ZnO-Ag under UV light.