

## Supporting Information

### Cellulose-based Fluorescent Film with Anti-counterfeiting and UV Shielding Capabilities Enabled by Enamine Bonds

Yuhong Qiao<sup>a, b</sup>, Youwei Ma<sup>b</sup>, Xiaomin Chen<sup>a, b</sup>, Wenyao Guo<sup>a</sup>, Yulin Min<sup>a</sup>, Jinchen Fan <sup>\*a, c</sup> and Zixing Shi<sup>\*b</sup>

#### \*Corresponding Authors

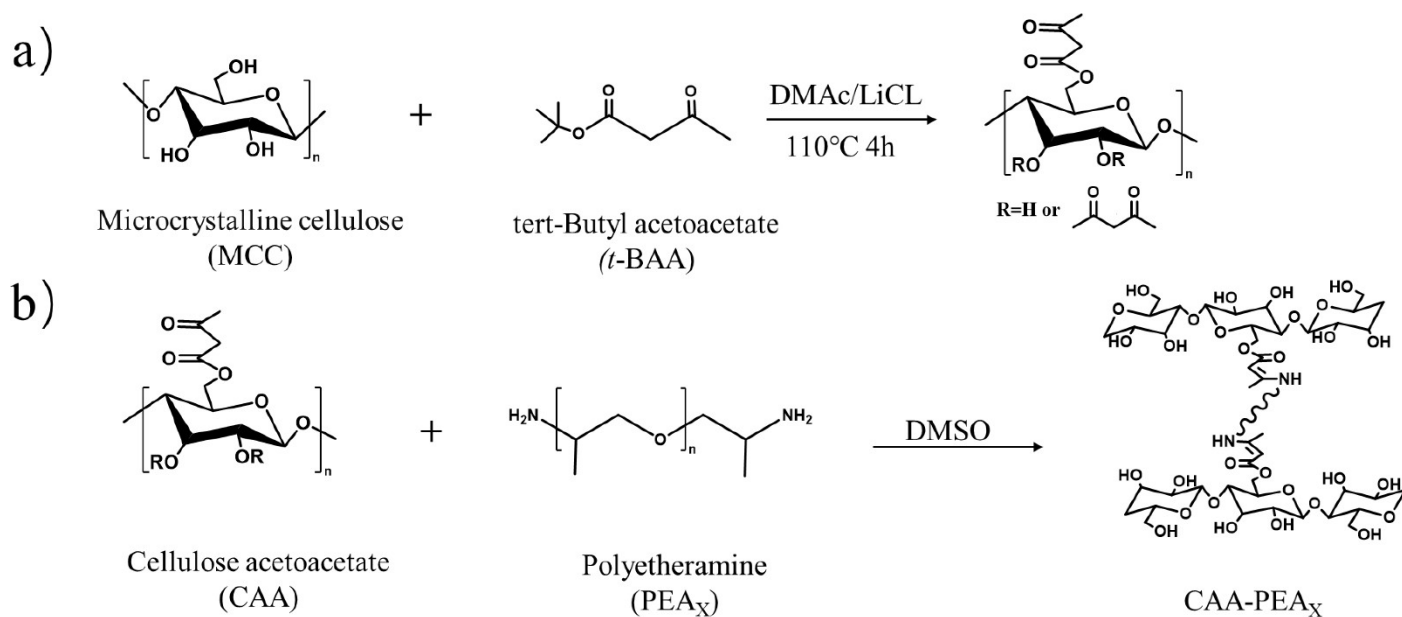
<sup>a</sup> College of Environmental and Chemical Engineering, Shanghai University of Electric Power, Shanghai 200090, China.

<sup>b</sup> School of Chemistry & Chemical Engineering, State Key Laboratory for Metal Matrix Composite Materials, Shanghai Jiao Tong University, Shanghai 200240, China.

<sup>c</sup> School of Materials and Chemistry, University of Shanghai for Science and Technology, Shanghai, 200093,

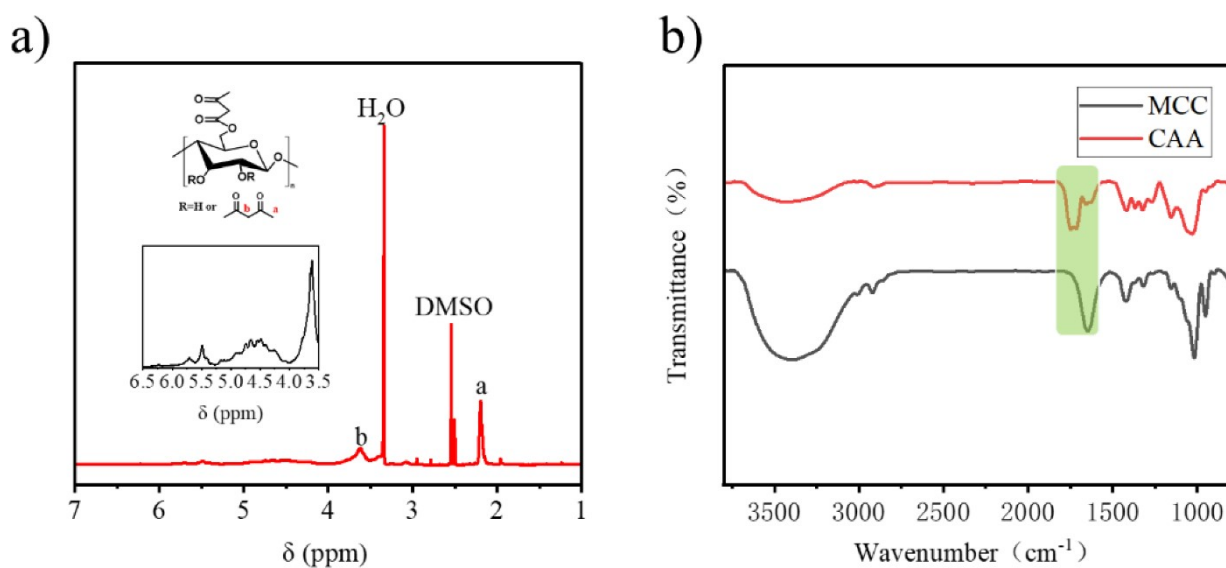
China

E-mails: jcfan@usst.edu.cn (J. F.), zxshi@sjtu.edu.cn (Z. S.)

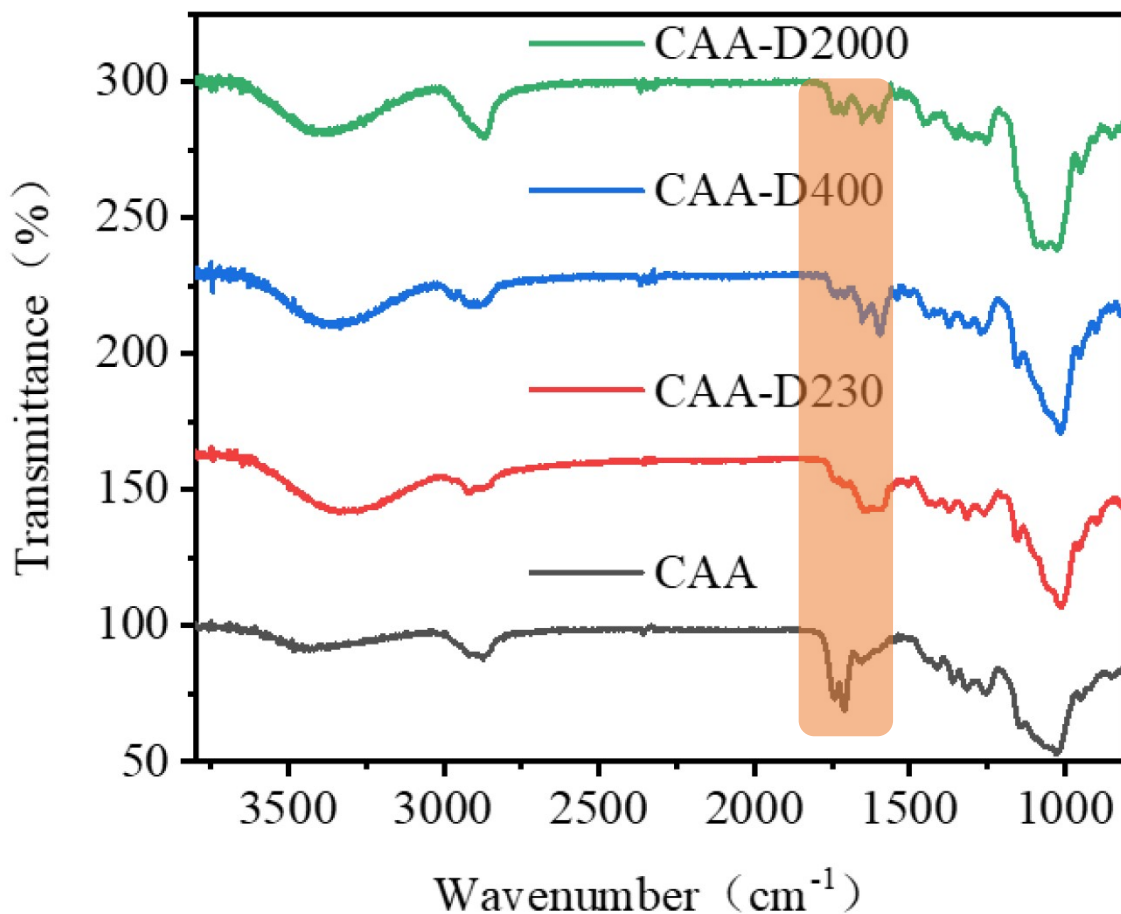


X: D230 D400 D2000

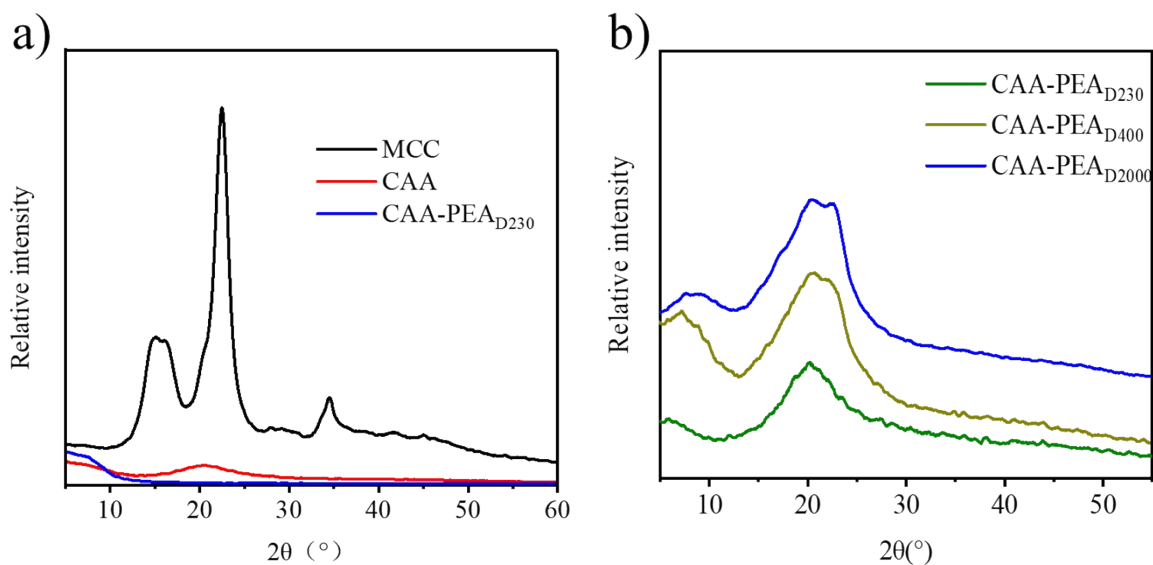
**Scheme S1.** (a) Cellulose acetoacetate (CAA) was obtained by transesterification of Microcrystalline cellulose (MCC) with tert-Butyl acetoacetate (*t*-BAA), (b) The sample (CAA-PEA<sub>X</sub>) was obtained by the enamine reaction of Cellulose acetoacetate with polyether amine (PEA).



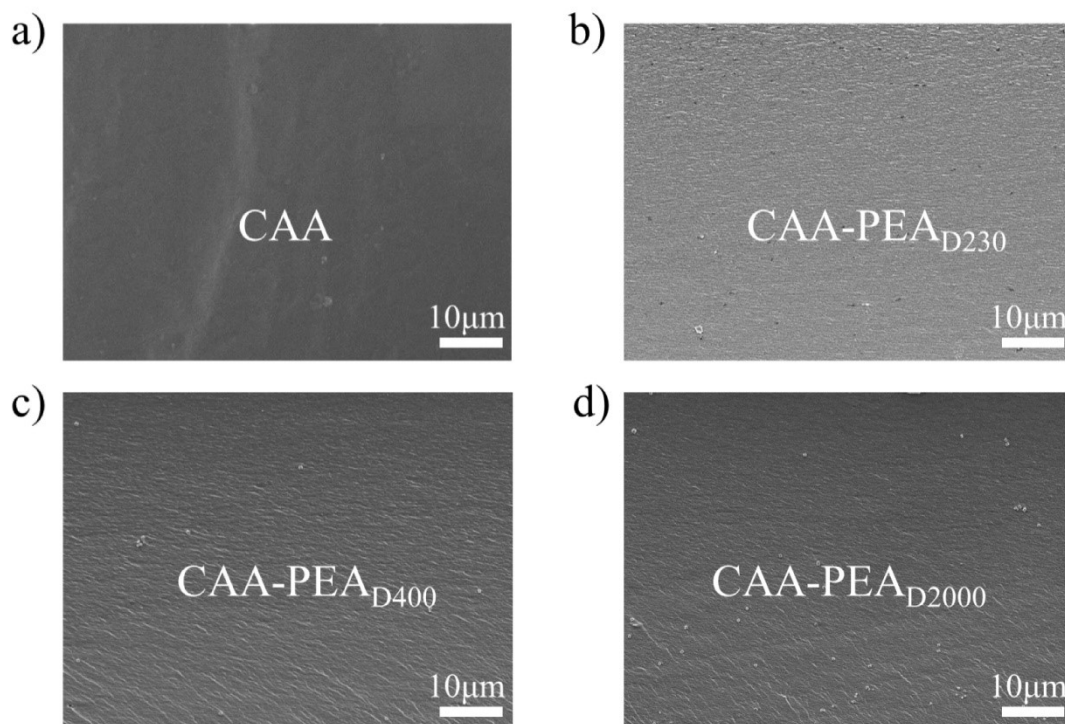
**Fig S1.** (a) <sup>1</sup>H NMR spectra of CAA in DMSO-*d*<sub>6</sub>, (b) FT-IR spectra of MCC and CAA.



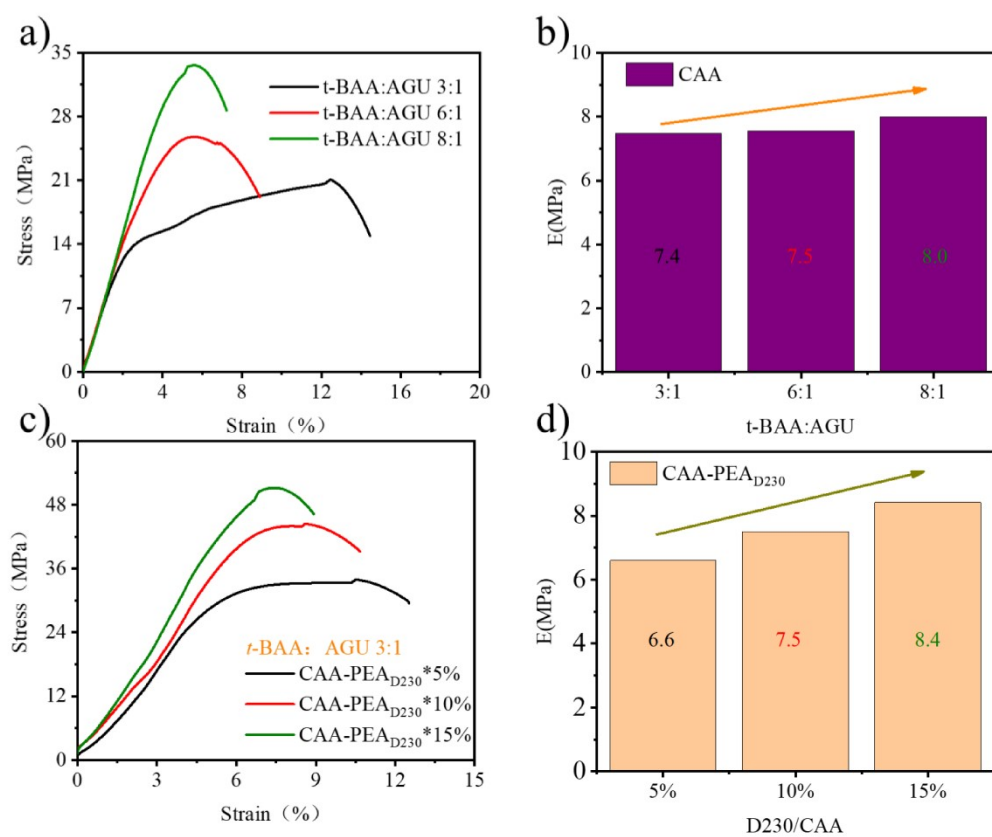
**Fig S2.** FT-IR spectra of CAA and CAA-PEA<sub>D230</sub>, CAA-PEA<sub>D400</sub>, and CAA-PEA<sub>D2000</sub> film.



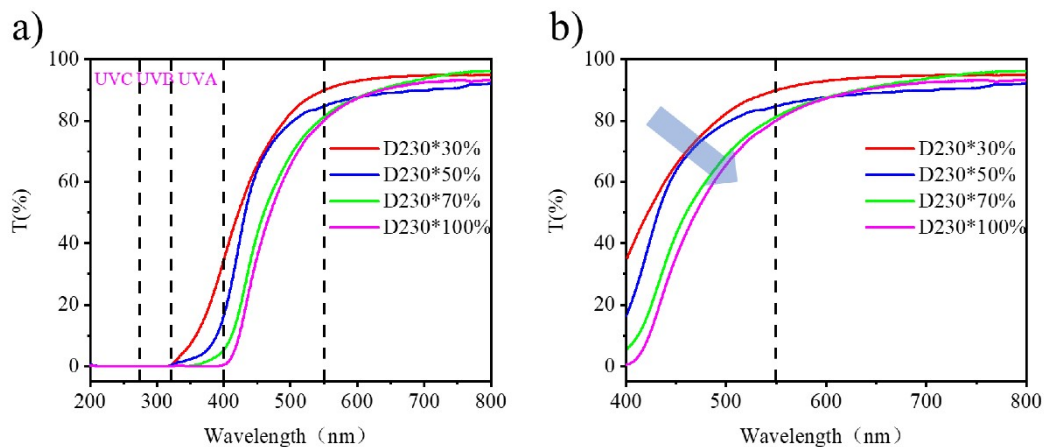
**Fig. S3** (a) XRD patterns of cellulose, CAA film, and CAA-PEA<sub>D230</sub> film, (b) XRD patterns of CAA-PEA (D230, D400, D2000) film.



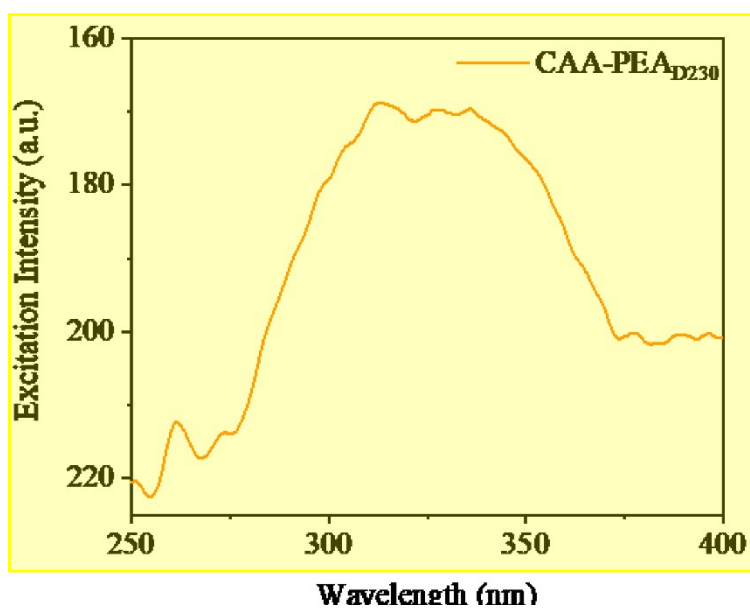
**Fig S4.** SEM of CAA and CAA-PEA<sub>D230</sub>, CAA-PEA<sub>D400</sub>, and CAA-PEA<sub>D2000</sub> film.



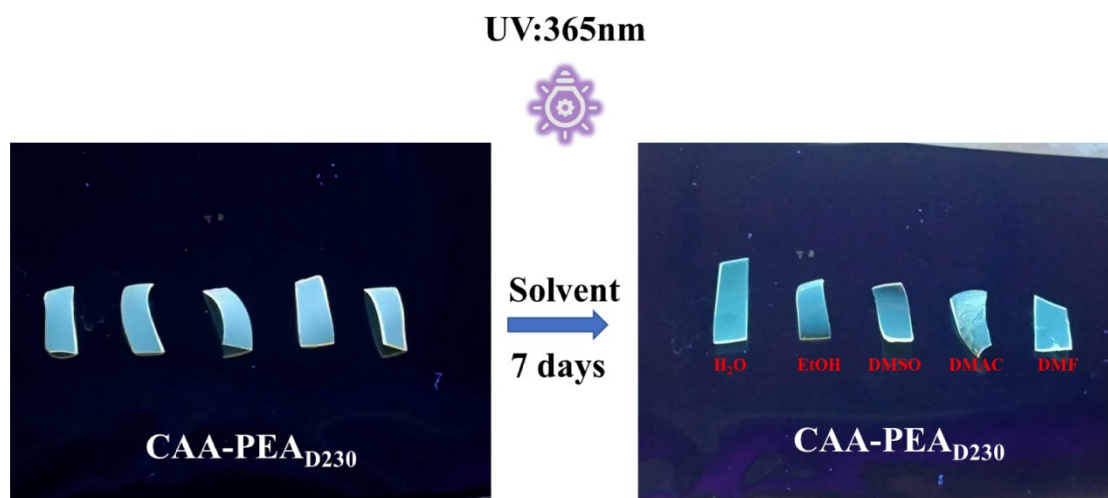
**Fig S5.** Stress-strain curves and moduli of CAA and CAA-PEA<sub>D230</sub> film of different proportions.



**Fig S6.** UV-visible light transmittance curves of different contents of polyetherimide.

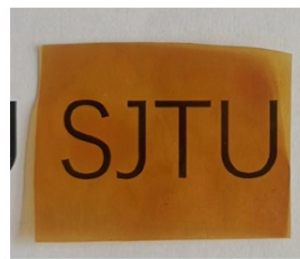
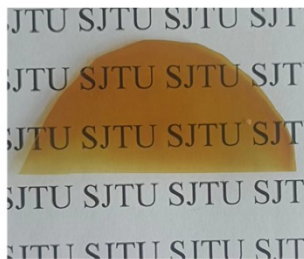


**Fig S7.** The excitation spectrum of CAA-PEA<sub>D230</sub>

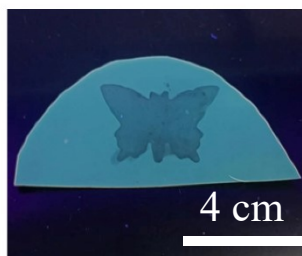


**Fig S8.** Digital photos of CAA-PEA<sub>D230</sub> film under 365 nm UV-light radiation after soaking in different solvents for 7 days.

  
Visible  
Light



  
UV  
365nm



**Fig S9.** CAA-PEA<sub>D230</sub> film with different security information.