https://doi.org/10.1007/s11467-023-1377-0

RESEARCH ARTICLE

Solar manipulations of perpendicular magnetic anisotropy for flexible spintronics

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Received September 27, 2023; accepted December 10, 2023

Supporting Information

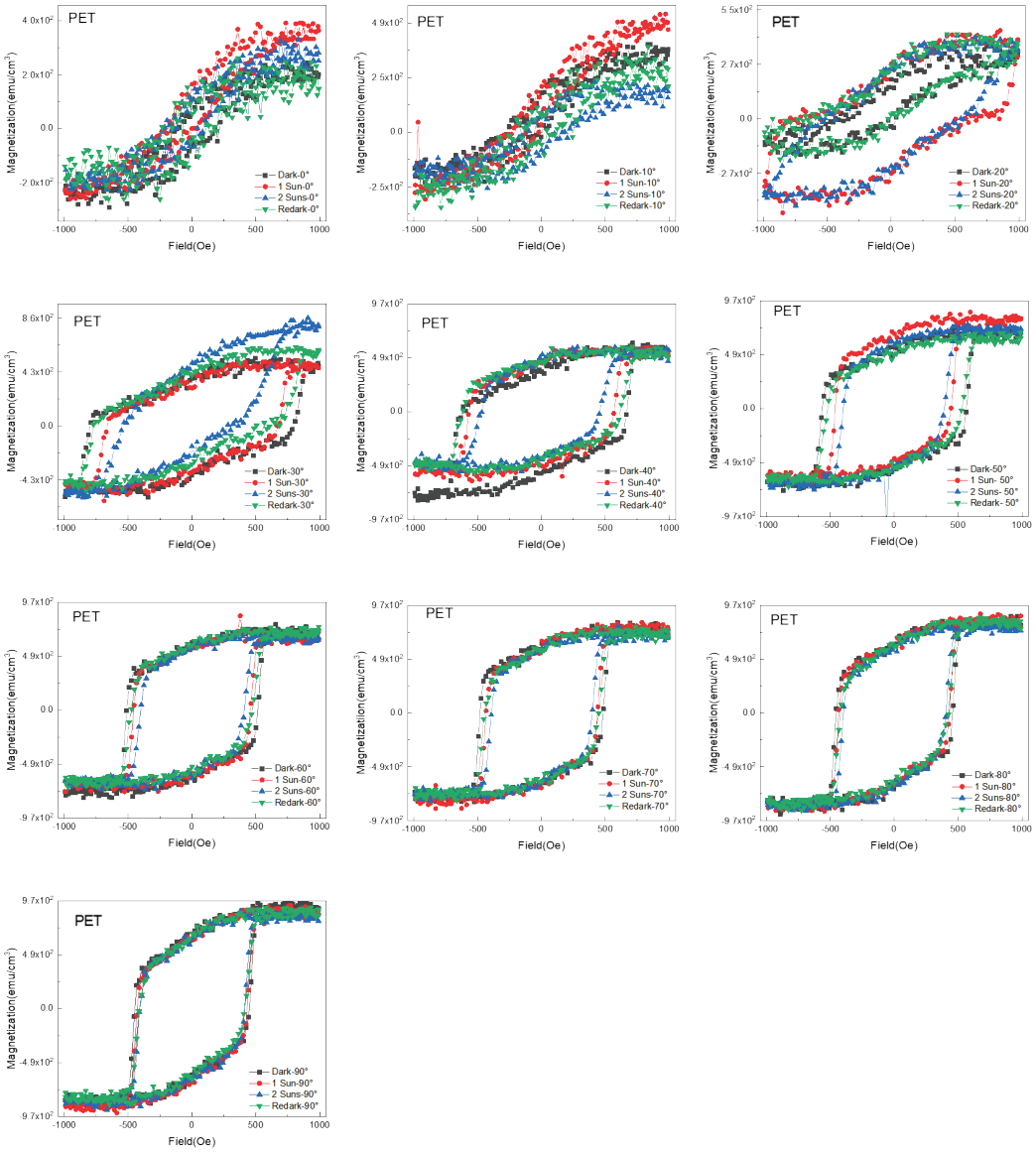

Fig. S1 The magnetic hysteresis loops of PMA in organic photovoltaic/ZnO/Pt/Co/Pt/Ta/PET flexible heterostructure from in-plane to out-of-plane on flat conditions, respectively.

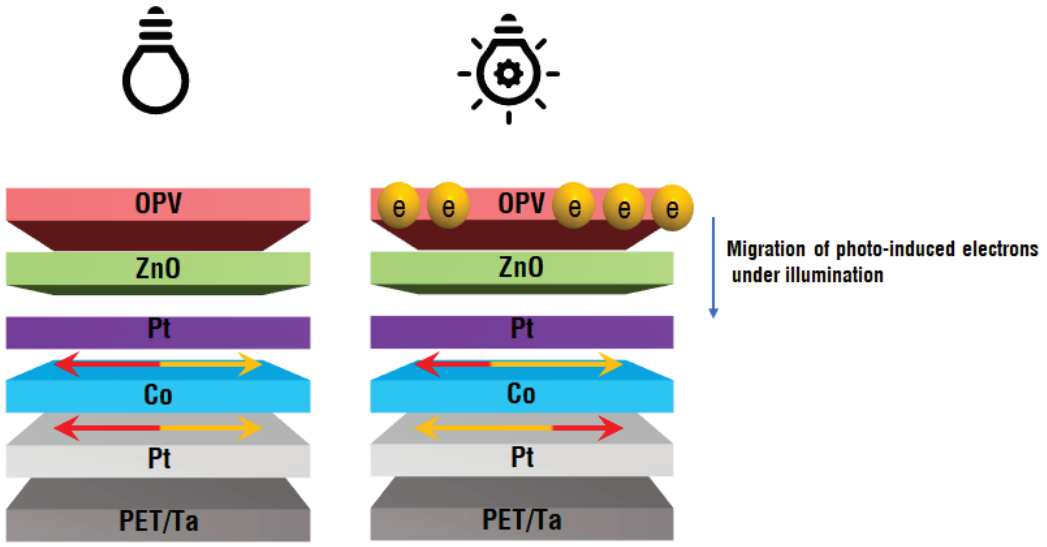

Fig. S2 The physical picture of light control of spin states. The yellow ball means the photo-induced electrons. The red and yellow arrows stand for the Rashba field induced by the in-plane and out-of-plane spin-orbital coupling change, respectively.

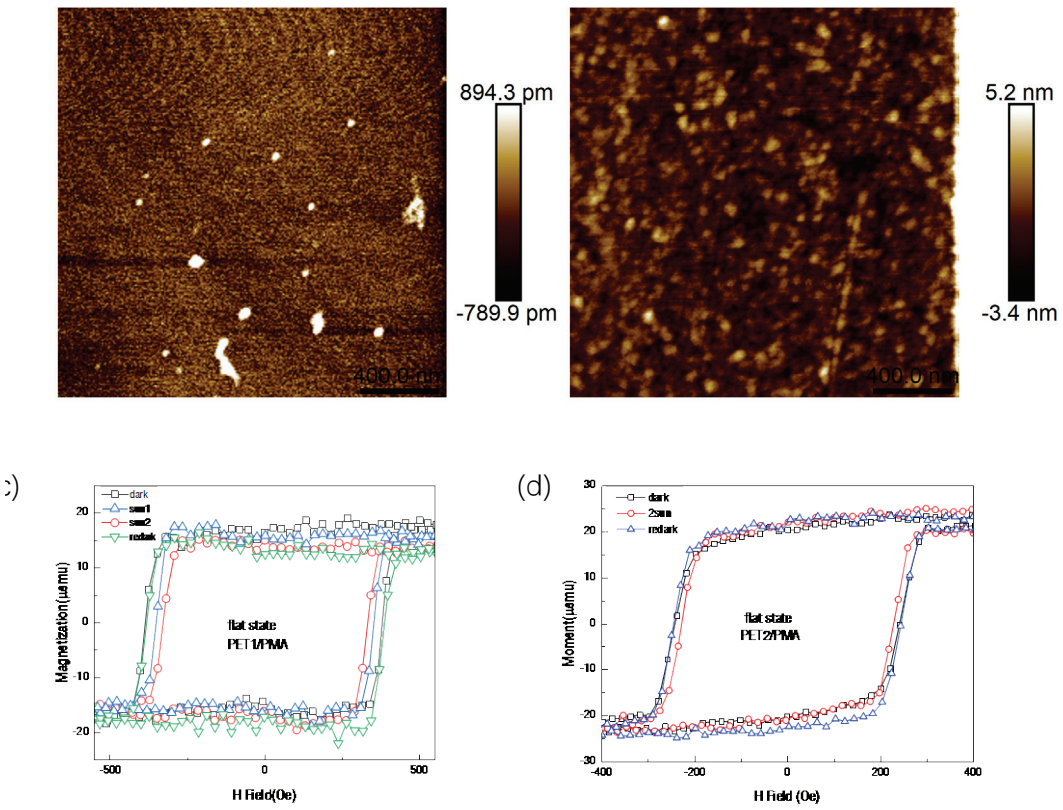

Fig. S3 The height images of PET substrates with different roughness of **(a)** PET1 substrate (Ra=0.170 nm, Rq=0.268 nm) and **(b)** PET2 substrate (Ra=0.804 nm, Rq=1.10 nm), respectively. The scale bar of AFM height images are both 400 nm. The M-H loops of PMA heterostructure on **(c)** PET1 substrate and (d) PET2 substrate with/without light illumination in out-of-plane direction, respectively.

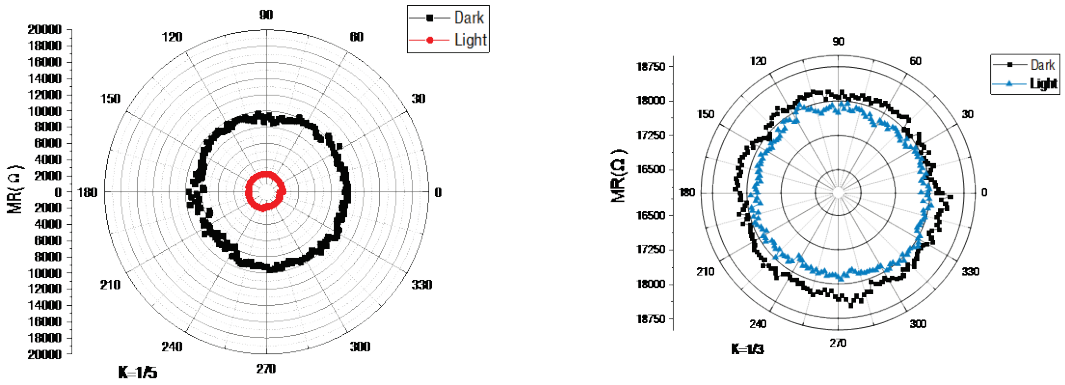

Fig. S4 The MR curves of thin film device before/after light illumination. **(a)** Thin film device with curvature of 1/5 mm^{-1}. **(b)** Thin film device with curvature of 1/3 mm^{-1}.