Electronic Supplementary Material (ESI) for Materials Advances.

Supporting Information

Scale up the charge transfer on $Pd@Ti_3C_2T_x–TiO_2$ catalysts: a sustainable approach for H_2 generation via water splitting

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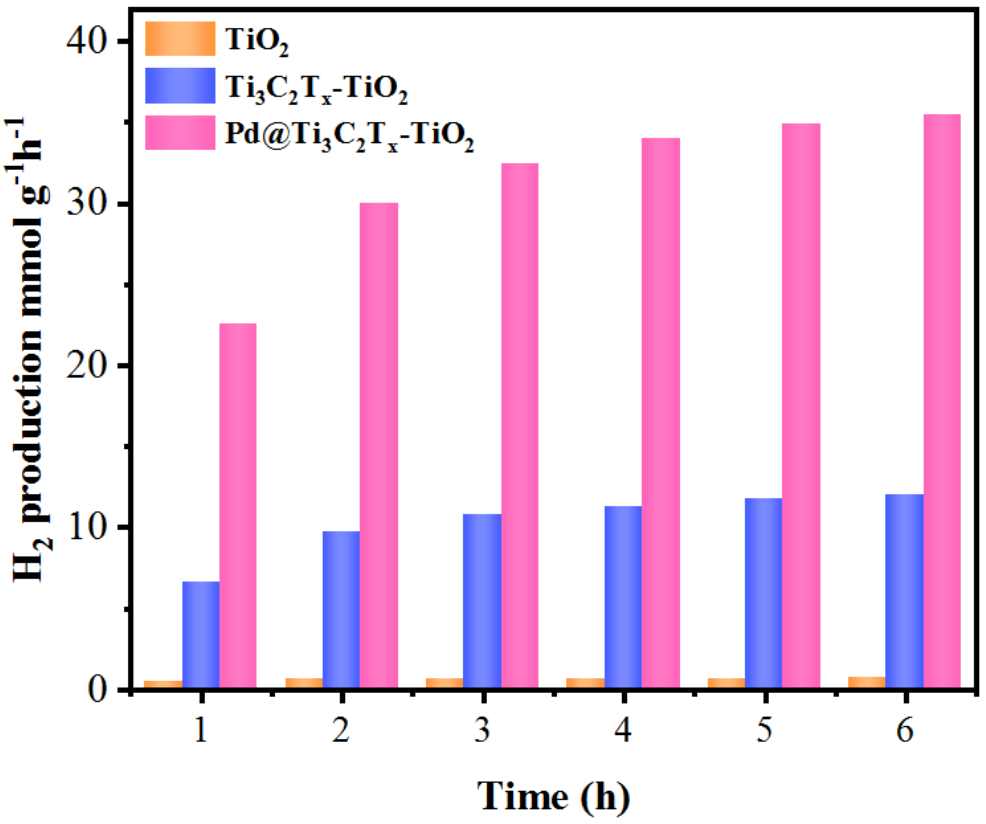

Figure S1: The Hydrogen evolution performance of TiO_2, $Ti_3C_2T_x$–TiO_2, and Pd@$Ti_3C_2T_x$–TiO_2 were illustrated in mmol g^{-1} h^{-1}.

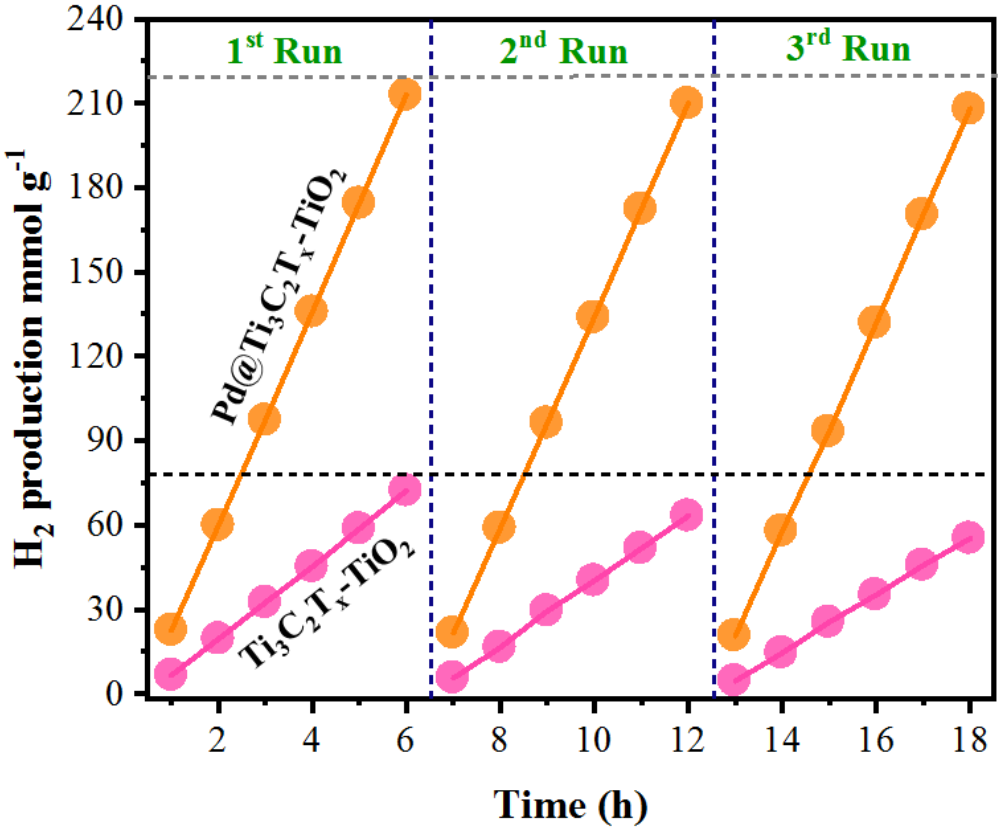

Figure S2: Recyclability of $Ti_3C_2T_x$–TiO_2 and Pd@$Ti_3C_2T_x$–TiO_2 catalysts.

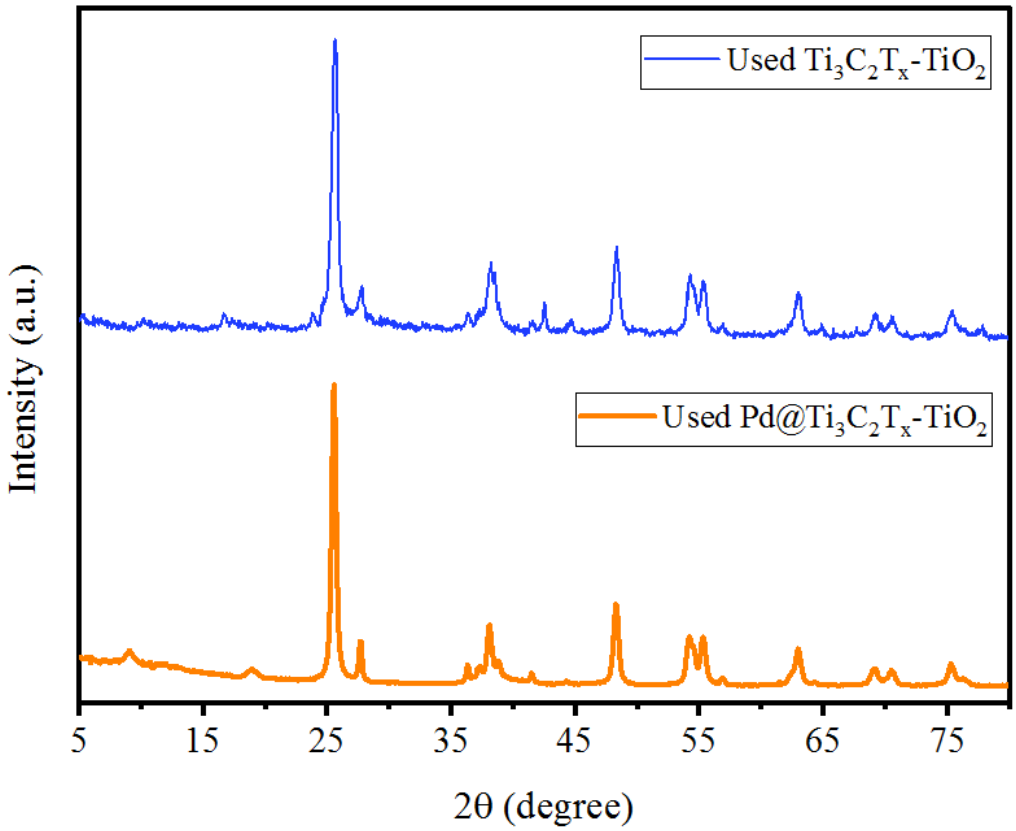

Figure S3: XRD of used $Ti_3C_2T_x$–TiO_2 and Pd@$Ti_3C_2T_x$–TiO_2 catalysts.

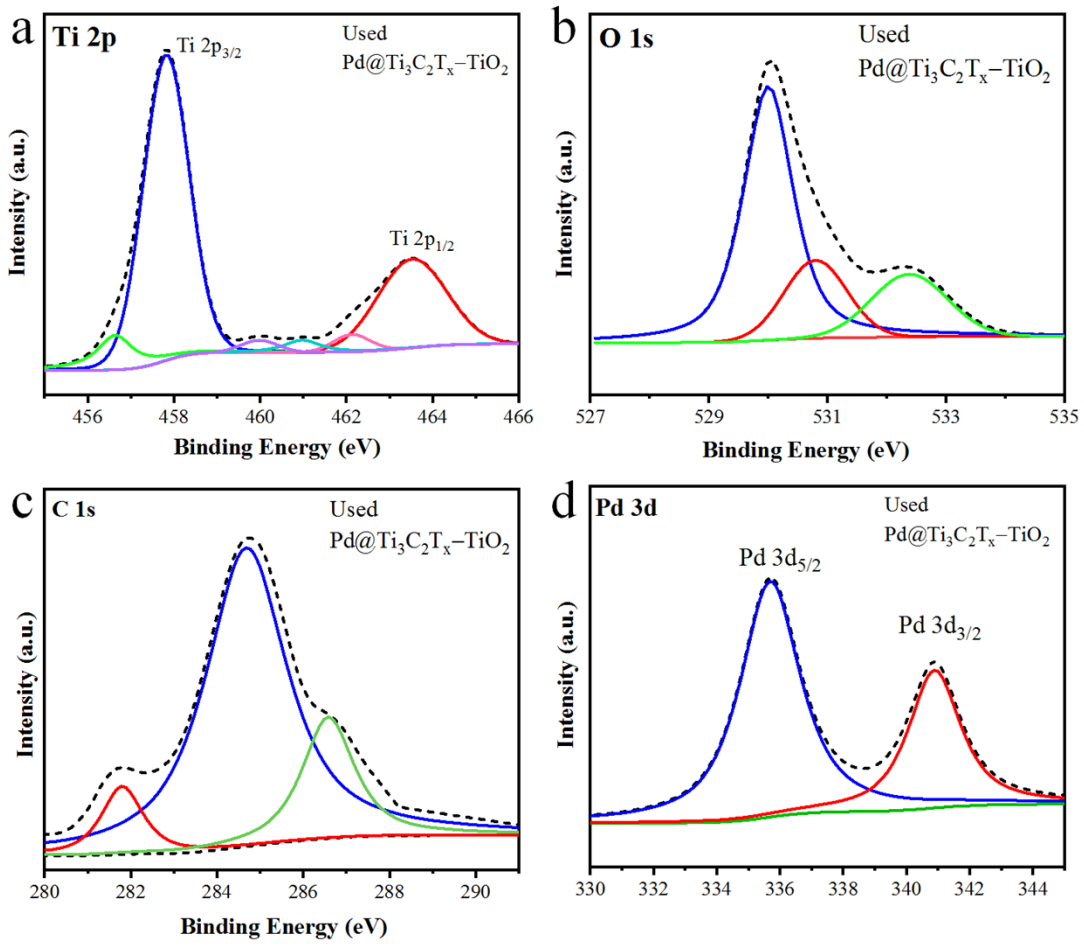

Figure S4: XPS results of used $Pd@Ti_3C_2T_x–TiO_2$ catalyst (a) Ti 2p (b) O 1s (c) C 1s and (d) Pd 3d.

Table S1: The comparison of related reported catalysts.

Sr No.	Catalyst	Light source	Catalyst amount (mg)	Sacrificial reagent	H_2 ($\mu molg^{-1}h^{-1}$)	Ref.
1	Ti_3C_2–TiO_2	300 W Xe arc	20	20% methanol	783.11	[1]
2	Ti_3C_2–TiO_2-500/Pt				1596.35	
3	$Ti_3C_2T_x/TiO_2$ (P25)	200 W Hg (285–325 nm)	30	25% methanol	79.5	[2]
4	TiO_2/C composite	300 W Xe arc (> 420 nm)	50	10 vol% (TEOA)	0.863	[3]
5	Mxene-TiO_2	300 W xenon	50	10 vol% (TEOA)	390.92	[4]
6	$BiVO_4/Ti_3C_2$	300 W Xe arc	10	15 % methanol	15.7	[5]
7	C-Ti/CN-10	300 W Xe	20	100 ml TEOA	1409	[6]
8	C-dots/g-C_3N_4/TiO_2 nanosheets	300 W Xe	50	10% vol TEOA	210	[7]
9	CdS-MoS_2-MXene	300 W Xe	5	0.25 M Na_2S	9679	[8]
10	$Ti_3C_2T_x$–TiO_2	450 W Xe	25	--	12600	This work
11	Pd@$Ti_3C_2T_x$–TiO_2	450 W Xe	25	--	35800	This work

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5. **Li, Y., et al.,** ***2D/2D heterostructure of ultrathin BiVO4/Ti3C2 nanosheets for photocatalytic overall Water splitting.*** **Applied Catalysis B: Environmental, 2021. 285: p. 119855.**
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