Electronic Supplementary Material (ESI) for RSC Advances.

Supporting information for:

Physical and photocatalytic properties of sprayed Dy doped ZnO thin films under sunlight irradiation for degrading methylene blue

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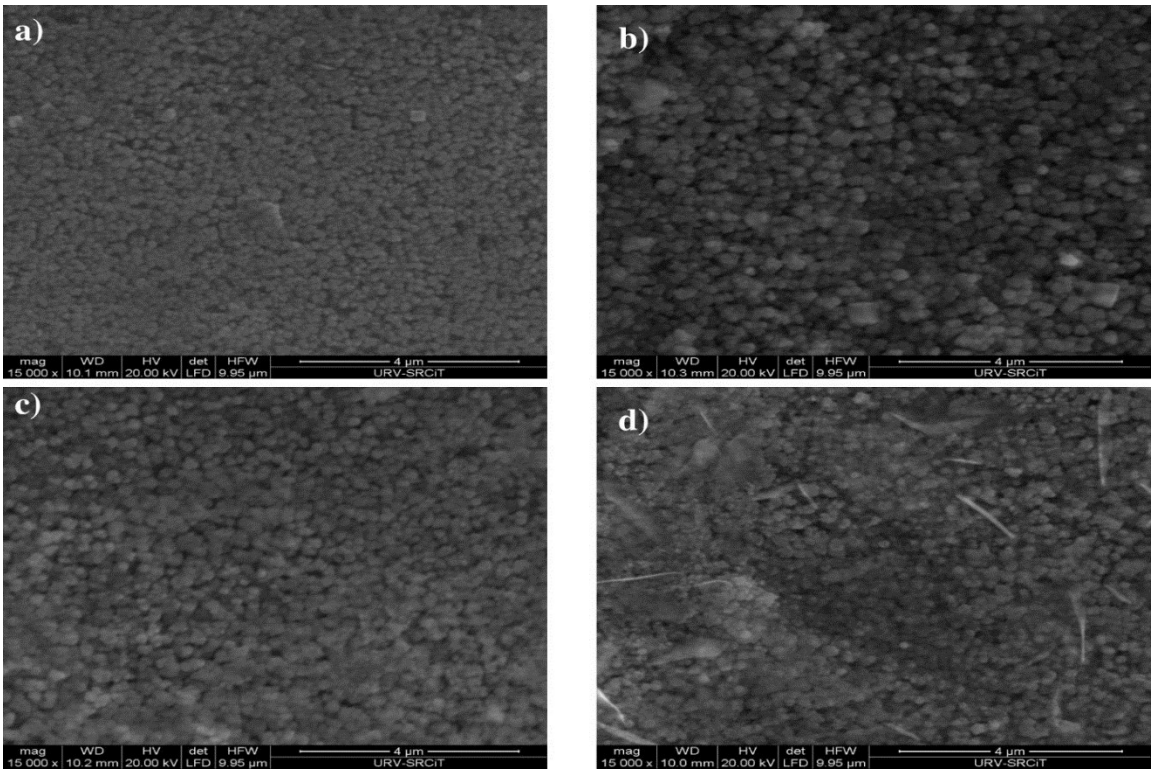

Figure S.1: SEM images of ZnO doped and undoped thin films: (a): Pure, (b) ZnO:Dy 2%,(c) ZnO : Dy4%, (d) ZnO : Dy 6%. All the films show dense and spherical structure strongly agglomerated. These results are consistent with the results of AFM.

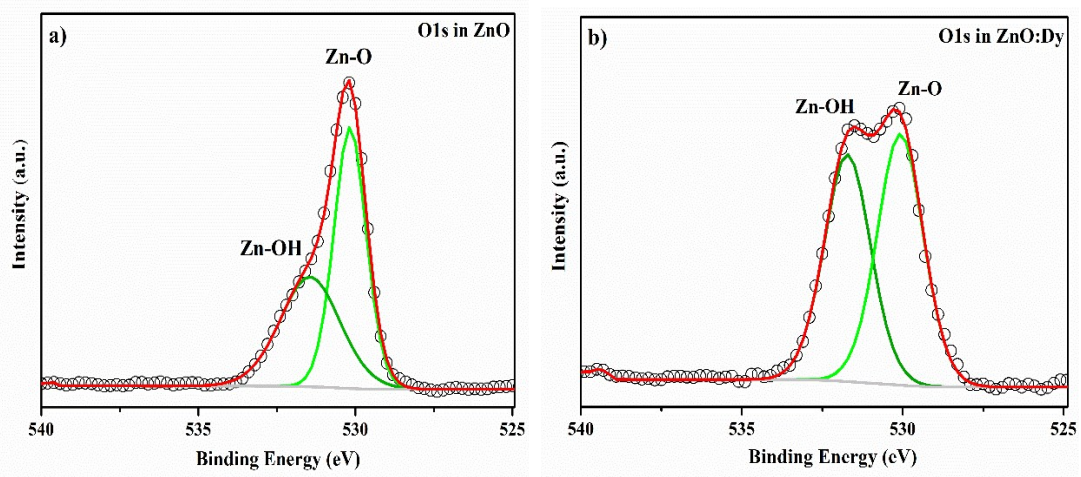

Figure S.2: O 1s peak analysis for the pure ZnO sample (a) and 6% doped Dy-ZnO (b).

Two main peaks are observed at 530.0 eV and 531.8 eV which are attributed to lattice oxygen of Zn-O and Zn-OH groups (defective ZnO), respectively.

Table S.1: XPS quantification expressed in at.%.

Sample	Oxygen	Zinc	Dysprosium
Pure ZnO	48.7	51.3	-
6% doped Dy-ZnO	57.0	38.0	6.0

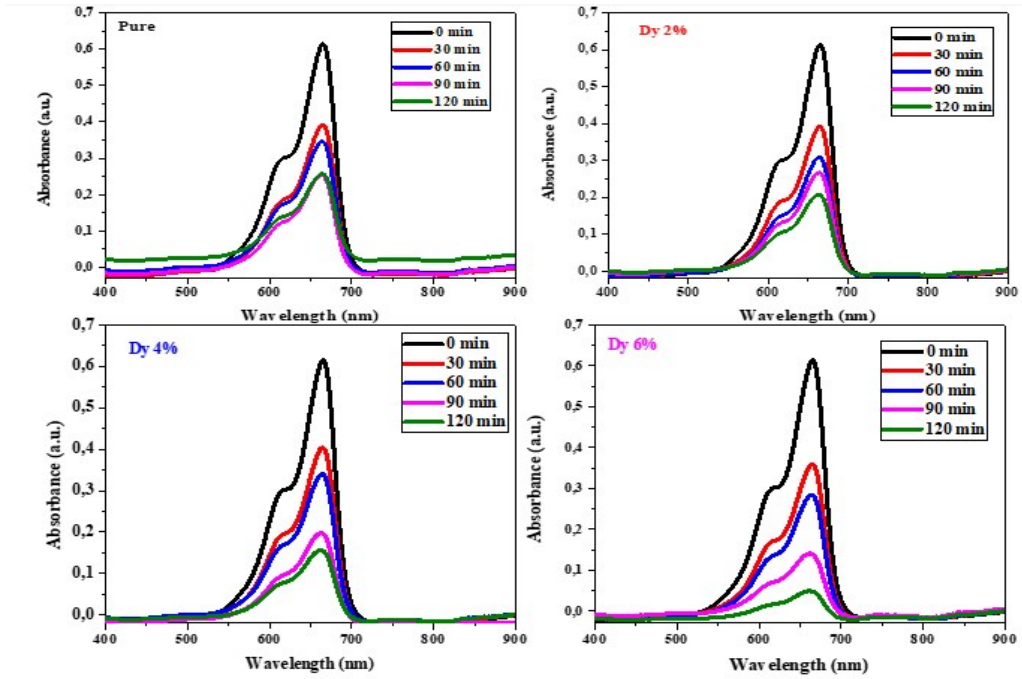

Figure S.3: Absorption spectra of MB after solar irradiation for 2 hours using the Dy doped ZnO thin films contents (first run)

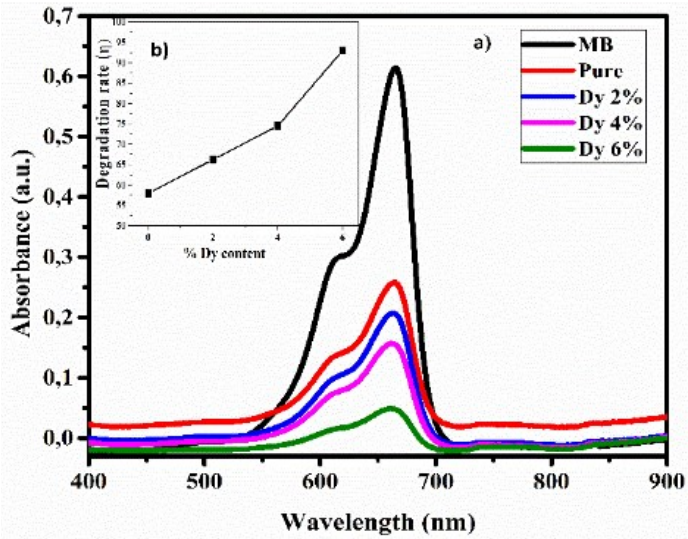

Figure S.3: Absorption spectra of MB after solar irradiation for 2 hours using the Dy doped ZnO thin films at various Dy contents.

Table S. 2. Comparison of photocatalytic activities of ZnO-doped rare earths materials for degrading dyes.

Photocatalyst	Method of elaboration	Sources of Irradiation	Dye	Degradation efficiency (%) -Time (min)	Ref.
Sm-ZnO	chemical precipitation	Visible lamp	MB	94.94% - 60 min	1
ZnO-Sm ZnO-Er ZnO-La	electrospinning	UV-light	Congo-Red dye	84.59- 240 min 78.86 - 240 min 73.23- 240 min	2
ZnO-Gd	Co-precipitation	Visible light	MB	93% - 90min	3
Dy-ZnO	sonochemical method.	UV light	MB	98% - 300min	4
Dy- ZnO	Combustion method	UV light	DR-31	99.6 - 60min	5
Dy-ZnO	Spray Pyrolysis	Solar irradiation	MB	92% - 120min	This work

References

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