**ZnO/(X wt.%)La2O3/NiO Based Ternary Heterostructure Nano-photocatalyst: Preparation, Characterization and its Application for the Degradation of Methylene Blue**

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*Characterization*

The prepared heterostrutures were characterized by X-ray diffraction, UV–Vis, FT-IR, FESEM and TEM. The XRD characterization is performed using Bruker diffractometer (Cu Kα (λ = 1.5406 Å) X-ray source). The spectral characterization was carried out by PerkinElmer UV-Vis spectrometer and Bruker IFS 66 v/S spectrometer are utilized for UV-Vis and FT-IR spectral analysis, respectively. The microscopic analysis such as SEM is carried to comprehend the surface morphology and particle size analysis is carried out by Field emission scanning electron microscope (FESEM) and TEM images are recorded with Transmission electron microscope, JEOL JEM2100 PLUS, operating at 200 kV accelerating voltage.

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**Fig. S1** UV–Vis. Spectra of the prepared ZnO/(3 wt.%)La2O3/NiOheterostructure.

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**Fig. S2** XRD analysis of the ZnO/(1 wt.%)La2O3/NiO, ZnO/(3 wt.%)La2O3/NiO and ZnO/(5 wt.%)La2O3/NiO samples.

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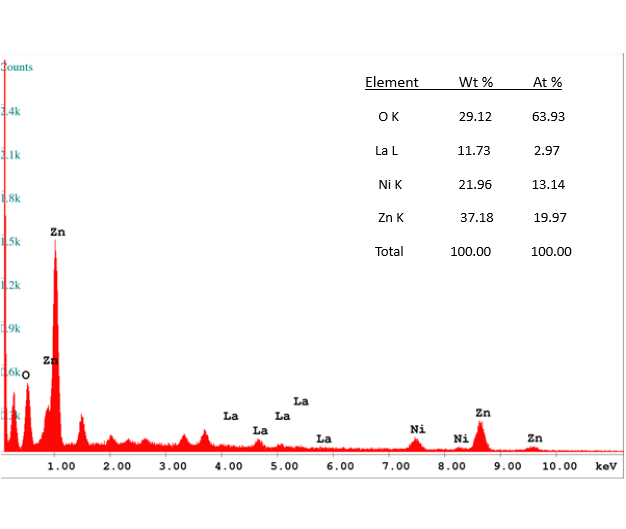
**Fig. S3** FT-IR spectrum of the as-prepared ZnO/(3 wt.%)La2O3/NiOheterostructure.

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**Fig. S4** FESEM micrographs of the as-fabricated ZnO/(3 wt.%)La2O3/NiOnanocomposite.



**Fig. S5** HRTEM images of synthesized ZnO/(3 wt.%)La2O3/NiOheterostructure.



**Fig. S6** EDX spectrum of ZnO/(3 wt.%)La2O3/NiOheterostructure.