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Title: DESIGN AND PHOTOCATALYTIC ACTIVITY OF
NANOSIZED ZINC OXIDES

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1 **Highlights**

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3 There is correlation between synthesis, structure and properties of nanoscaled ZnO's.

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5 The photocatalytic activity of ZnO under Vis radiation depends on its band gap level.

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7 The ZnO granulometry dominated its efficiency in AOP under UV radiation.

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9 Tribophysical treatment has a dual impact on the ZnO photocatalytic activity.

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15 **DESIGN AND PHOTOCATALYTIC ACTIVITY OF NANOSIZED ZINC OXIDES**

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22

23 **Abstract**

24 Zinc oxide particles with various morphologies were successfully prepared via three synthesis
25 methods: precipitation; tribophysical treatment and sonochemistry. The as-synthesized
26 samples were characterized by X-ray diffraction (XRD); infrared spectroscopy (IR); scanning
27 electron microscope (SEM); BET specific surface area; electron-paramagnetic resonance
28 (EPR), UV-Vis absorption/diffuse reflectance and X-ray photoelectron spectroscopy (XPS).
29 Photocatalytic activities of the samples were evaluated by degradation of Malachite Green
30 (MG) in an aqueous solution under UV and visible irradiation.

31 The obtained ZnO powders possess crystallites size below 20nm. The ZnO with spherical
32 particles were obtained by precipitation method. The sonochemistry approach leads to

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