Photocatalytic reductive and oxidative ability study of pristine ZnO and CeO2-ZnO heterojunction impregnated with Cu2O

4f

–

in-situ

2. Materials and Methods

2.1 Samples preparation

ZnO and CeO_2-ZnO synthesis

CH_3CH_2OH

via

CH_3CH_2OH

Surface impregnation of ZnO and CZ1 with Cu_2O

CH_3CH_2OH

2.2 Characterization methods

X'Pert PRO MPD diffractometer using a copper Kα radiation source (0.154056 nm). The intensities were obtained in the 2θ range between 20° and 80°. X'Pert High

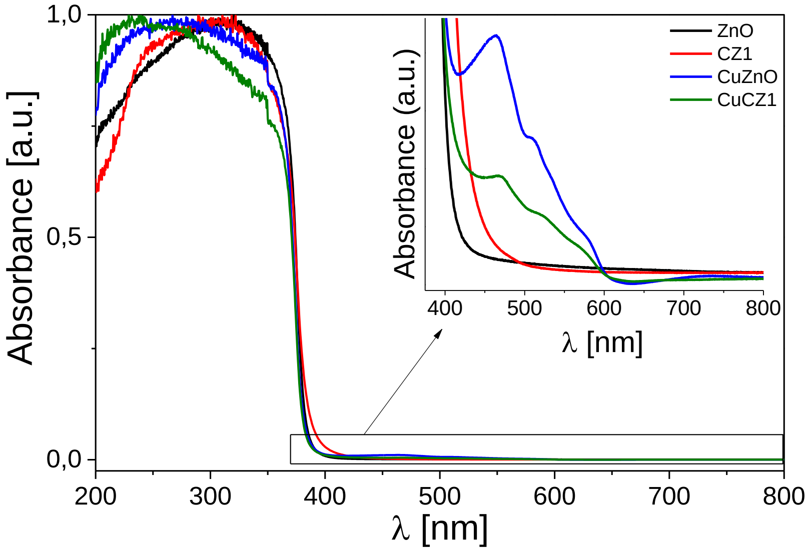

Figure 2. UV- vis analysis (Absorbance Kubelka-Munk transformed diffuse reflectance spectra) of: ZnO (black line), CZ1 (red line), CuZnO (blue line), CuCZ1 (green line).

– *2p* –

4s

2p

4f

– ➔

3.3 EPR characterization of the impregnated materials

I

I

g

g

1+

$$\hat{H} \quad \beta_e B g \hat{S} \quad \hat{S}^T A \hat{I} \qquad (1)$$

β_e B

S I

g A

$g_{//}$ $g_{\perp}$ $A_{//}$ $A_{\perp}$

species coming as “waste” from the impregnation

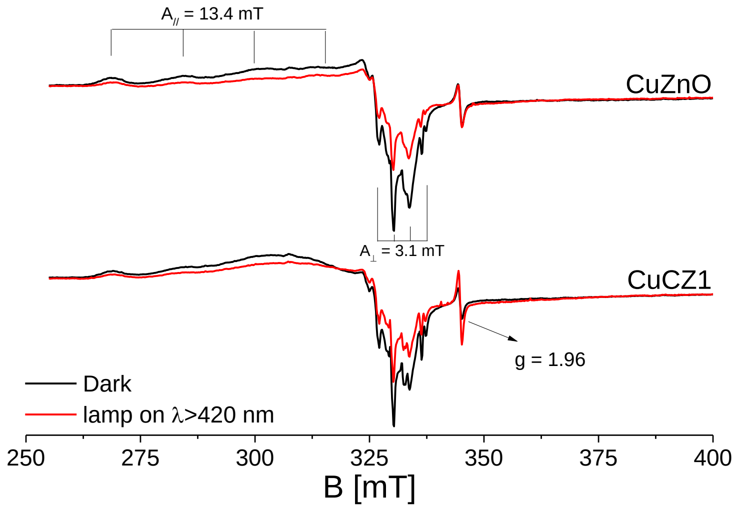

Figure 3. EPR spectra recorded at 77K of CuZnO and CuCZ1 before (black lines) and during irradiation using band pass filter at λ ≥ 420 nm (red line).

λ ≥

2+

coming as “waste” from the impregnation procedure

3.4 Photocatalytic H_2 evolution

λ ≥

hydrogen evolution reaction *oxygen evolution reaction*

Normal Hydrogen Electrode

➔

➔

➔

μ

Materials and Methods

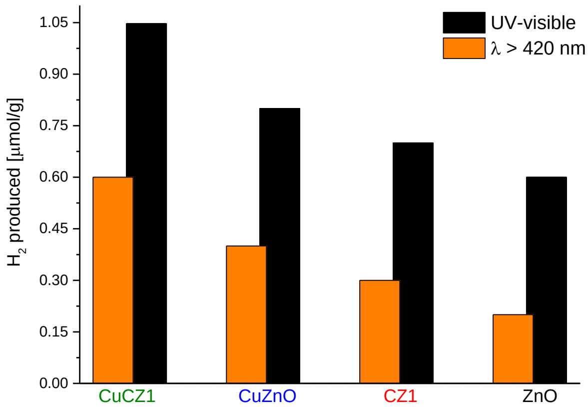

Figure 4. H_2 production over different samples after 2h of irradiation: black bars for UV-visible irradiation, orange bars for band pass filter at λ ≥ 420 nm (solely visible light).

μ

3.5 Photodegradation of Tolyltriazol

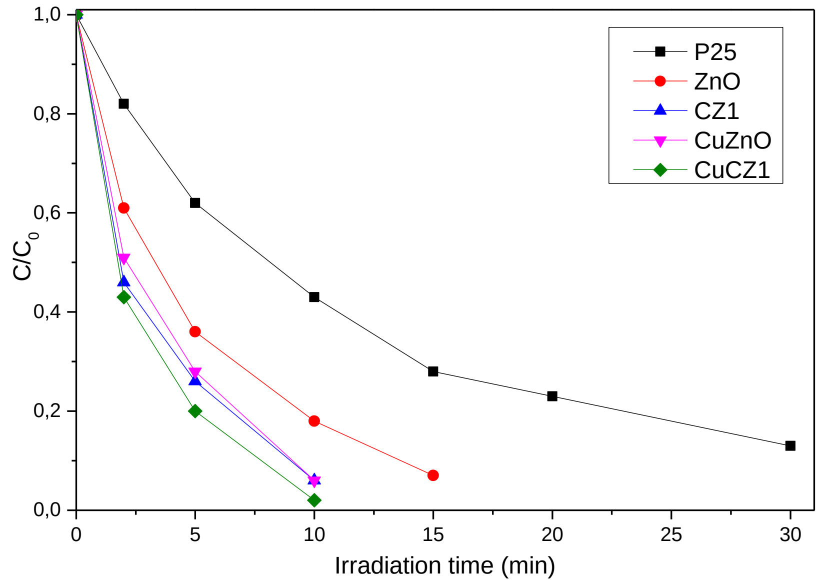

Figure 5. Degradation of tolyltriazol in the presence of the developed photocatalysts.

4. Discussion

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species, coming as “waste” by the synthetic route.

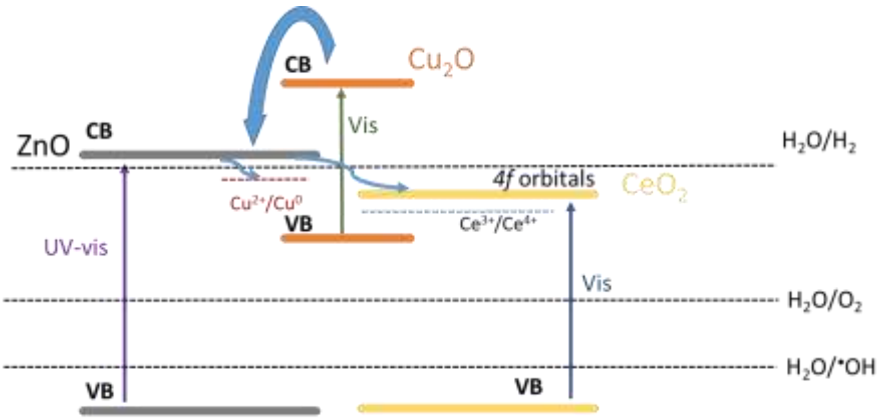

Figure 6. Proposed working mechanism upon irradiation of the triphasic solid Cu_2O-CeO_2-ZnO.

5. Conclusions

doesn’t affect the

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