# Electronic Supplementary Information to :

# Self-tuned properties of Cu-ZnO catalysts for hydroxymethylfurfural hydrodeoxygenation towards DMF production

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**Table S1.** ZnO cell parameters obtained by Rietvelt refinement of X-ray diffractograms of CuZnO(I) and CuZnO(P) catalysts during the test cycling procedure.

| Sample | Cell parameter a [Å] | Cell parameter c [Å] |
|---|---|---|
| ZnO | 3.249(1) | 5.203(1) |
| CuZnO(I) | 3.249(1) | 5.204(1) |
| CuZnO(I)-used | 3.248(1) | 5.205(1) |
| CuZnO(I)-used-(ox) | 3.249(1) | 5.205(1) |
| CuZnO(P) | 3.248(1) | 5.206(1) |
| CuZnO(P)-used | 3.249(1) | 5.205(1) |
| CuZnO(P)-used-(ox) | 3.249(1) | 5.205(1) |

**Table S2.** Mean particle size of the Cu phase in the CuZnO(I) catalyst during the test cycling procedure (tests 1 to 5).

| **Sample** | **Phase** | **Mean particle size [nm]** |
|---|---|---|
| CuZnO(I) | CuO | 21 |
| CuZnO(I)-used (*ie.* used after 1$^{st}$ test) | Cu | 28 |
| CuZnO(I)-used-(ox) (*ie.* used after 1$^{st}$ test and reoxidized) | CuO | 11 |
| Used after 2$^{nd}$ test | Cu | 32 |
| Used after 2$^{nd}$ test and reoxidized | CuO | 12 |
| Used after 3$^{rd}$ test | Cu | 23 |
| Used after 3$^{rd}$ test and reoxidized | CuO | 12 |
| Used after 4$^{th}$ test | Cu | 27 |
| Used after 4$^{th}$ test and reoxidized | CuO | 12 |
| Used after 5$^{th}$ test | Cu | 28 |

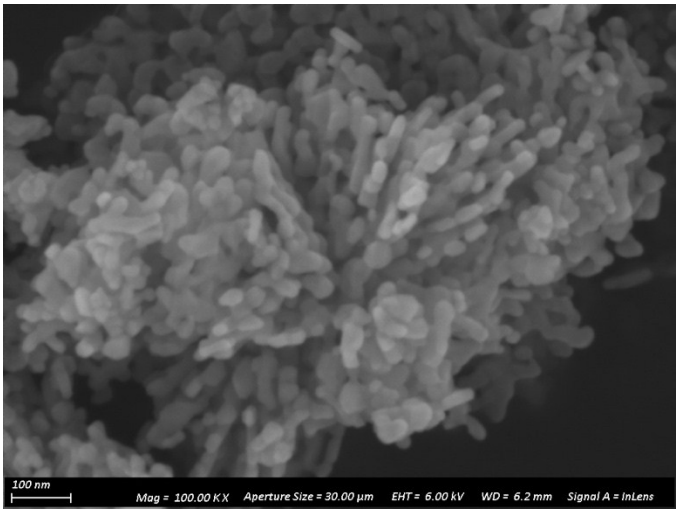


**Figure S1.** SEM image of the bare ZnO support.

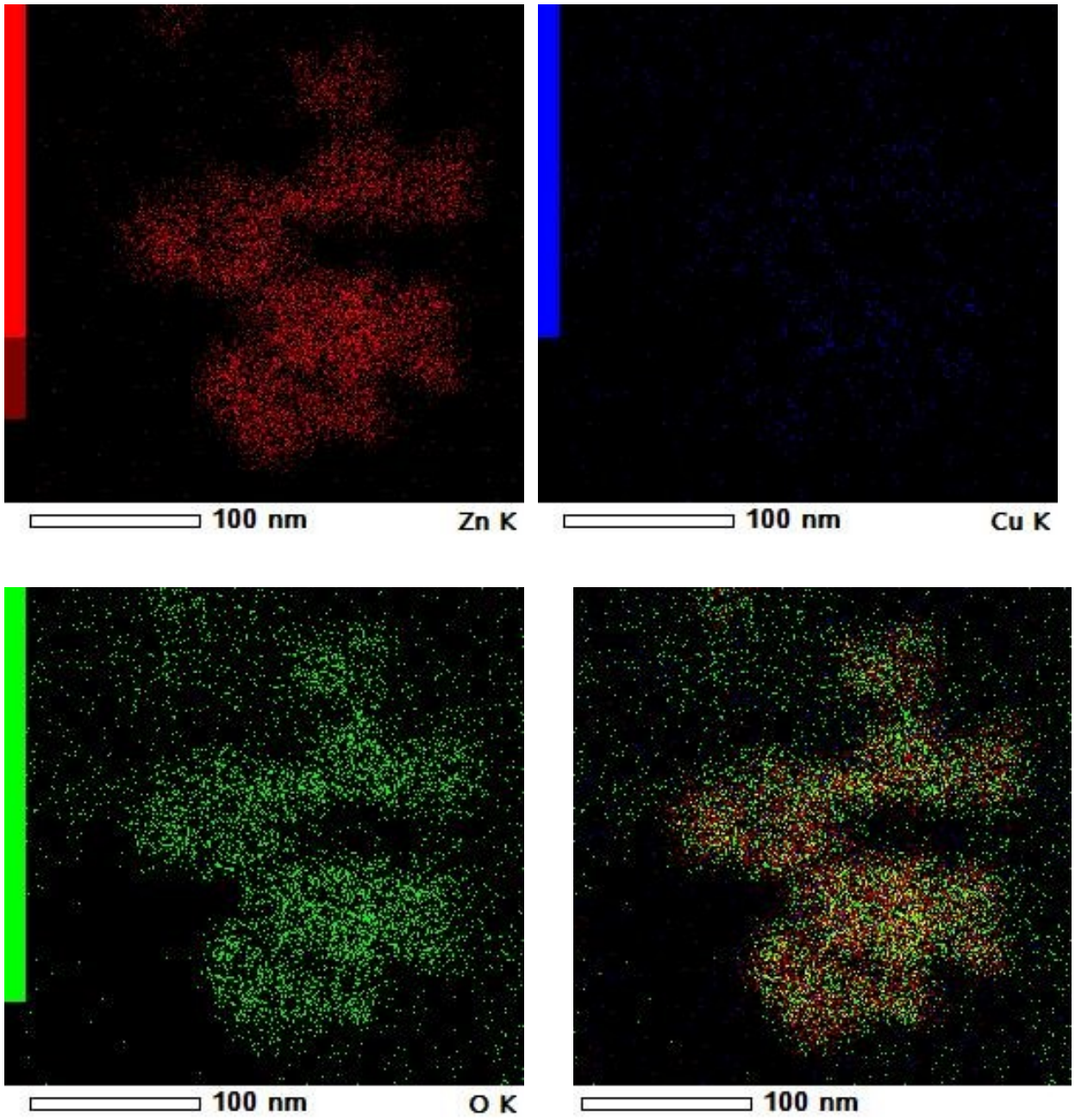


**Figure S2.** Mapping scanning transmission electron microscopy (STEM) imaging recorded on the CuZnO(P) catalyst prepared *via* the photo-assisted way : (red) Zn K, (blue) Cu K, (green) O K and (overlay).

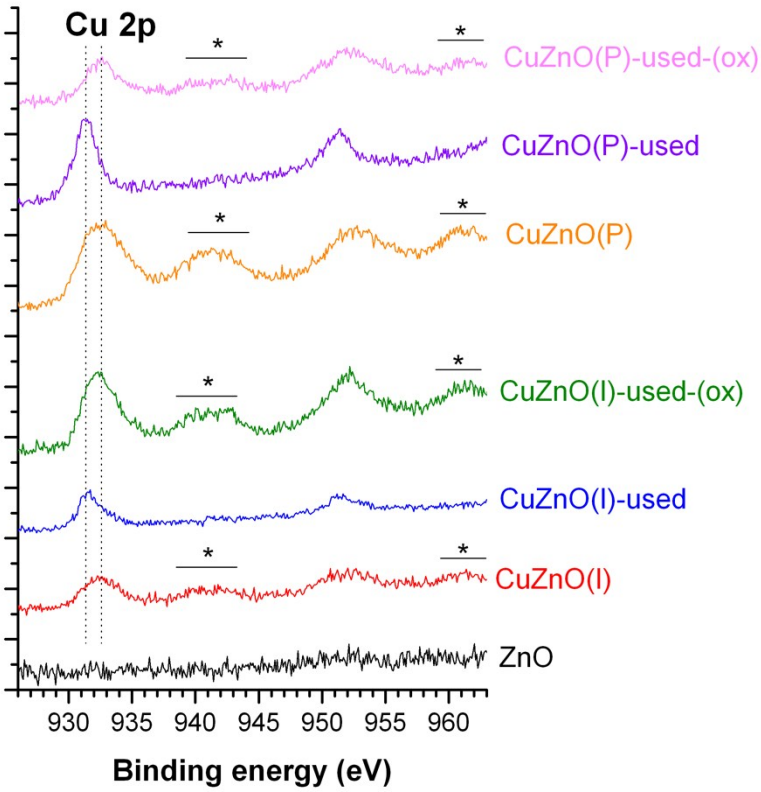


**Figure S3.** Influence of the CuZnO catalyst preparation method and of the treatment applied (fresh, used and used catalyst after reoxidation step) on the Cu $2p_{3/2}$ and $2p_{1/2}$ orbital region of the XPS spectra recorded for both series of catalysts. (*) corresponds to $Cu^{2+}$ satellites.