

## SUPPLEMENTARY MATERIAL

# Materials Based on Co, Cu, and Cr as Activators of PMS for Degrading a Representative Antibiotic—The Strategy for Utilization in Water Treatment and Warnings on Metal Leaching

Efraím A. Serna-Galvis <sup>1,2,\*</sup>, Carlos Mendoza-Merlano <sup>2</sup>, Ricardo A. Torres-Palma <sup>1</sup>, Adriana Echavarría-Isaza <sup>2</sup> and Dora A. Hoyos-Ayala <sup>3,\*</sup>

<sup>1</sup> Grupo de Investigación en Remediación Ambiental y Biocatálisis (GIRAB), Instituto de Química, Facultad de Ciencias Exactas y Naturales, Universidad de Antioquia UdeA, Medellín 050010, Colombia; ricardo.torres@udea.edu.co

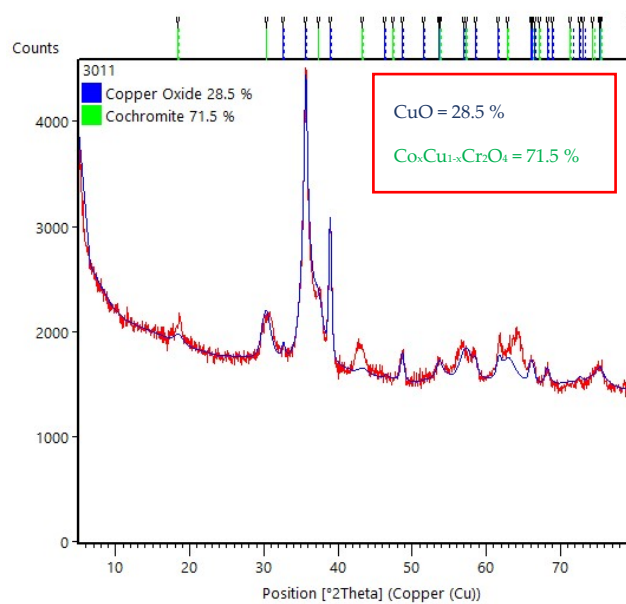
<sup>2</sup> Grupo de Catalizadores y Adsorbentes (CATALAD), Instituto de Química, Facultad de Ciencias Exactas y Naturales, Universidad de Antioquia UdeA, Medellín 050010, Colombia; cjavier.mendoza@udea.edu.co (C.M.-M.); adriana.echavarria@udea.edu.co (A.E.-I.)

<sup>3</sup> Grupo de Ingeniería y Gestión Ambiental (GIGA), Facultad de Ingeniería, Universidad de Antioquia UdeA, Medellín 050010, Colombia

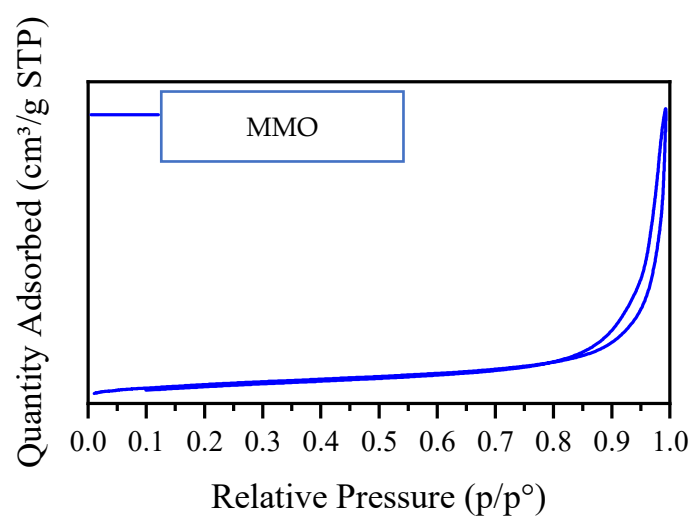
\* Correspondence: efrain.serna@udea.edu.co (E.A.S.-G.); dora.hoyos@udea.edu.co (D.A.H.-A.)

**Table S1.** Leaching of cobalt from  $\Phi y$  after each reuse cycle.

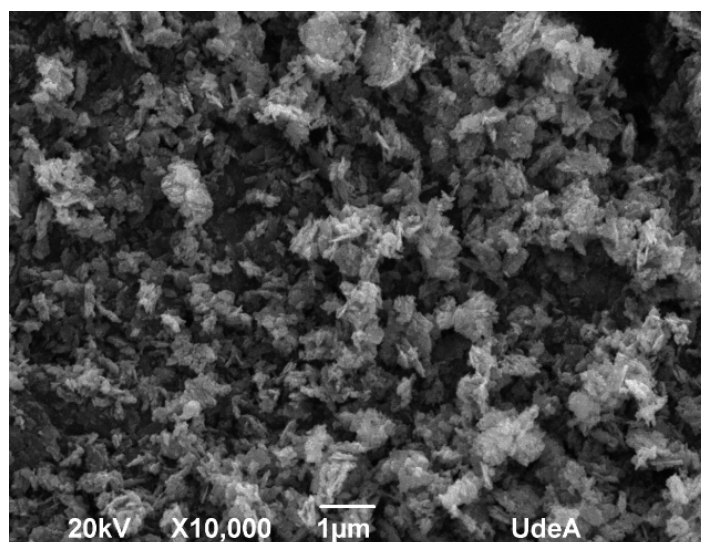
Cycle	Leached Cobalt
	(mg L <sup>-1</sup> )
1	1.6
2	1.3
3	1.1



**Figure S1.** XRD Rietveld refinement for MMO.

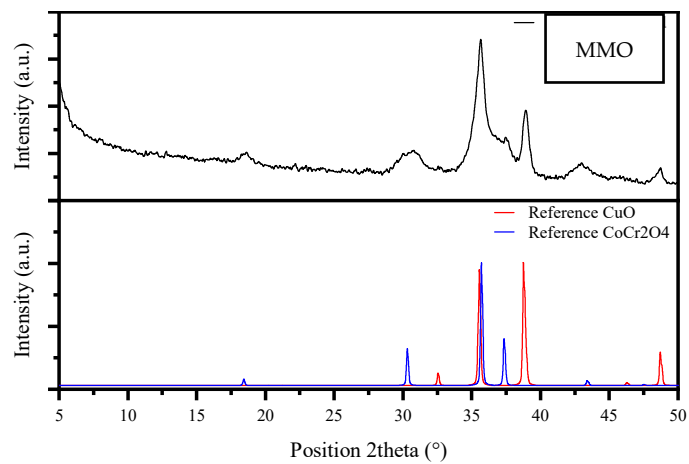


(a)

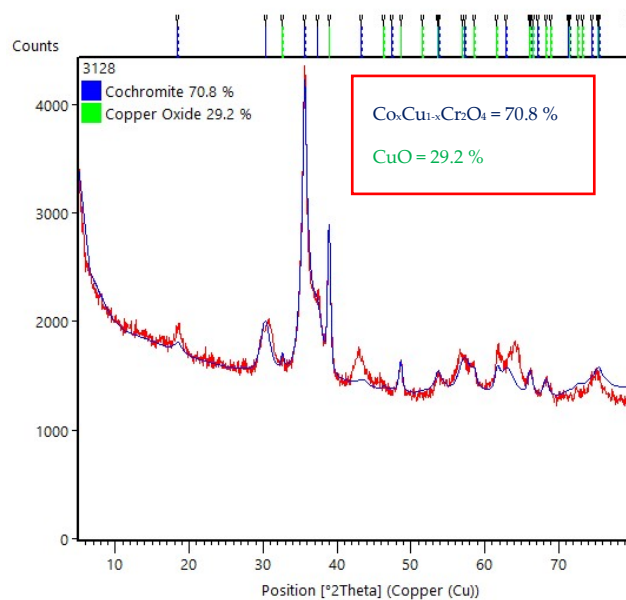


(b)

**Figure S2.** (a) The N<sub>2</sub>-adsorption isotherm for MMO. (b) SEM for MMO.

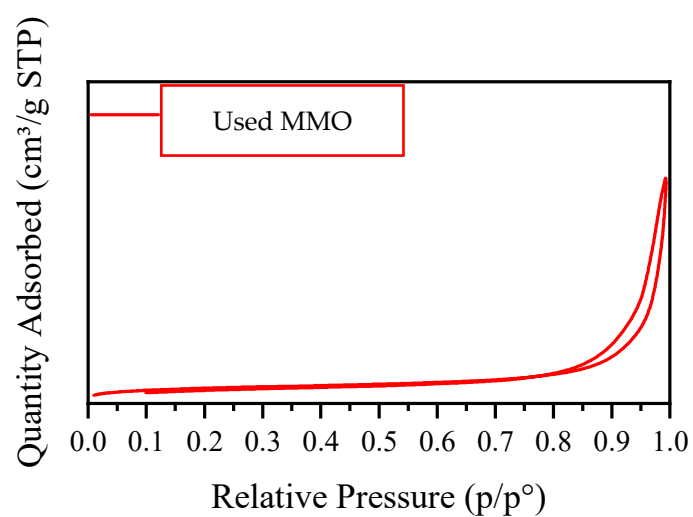


(a)

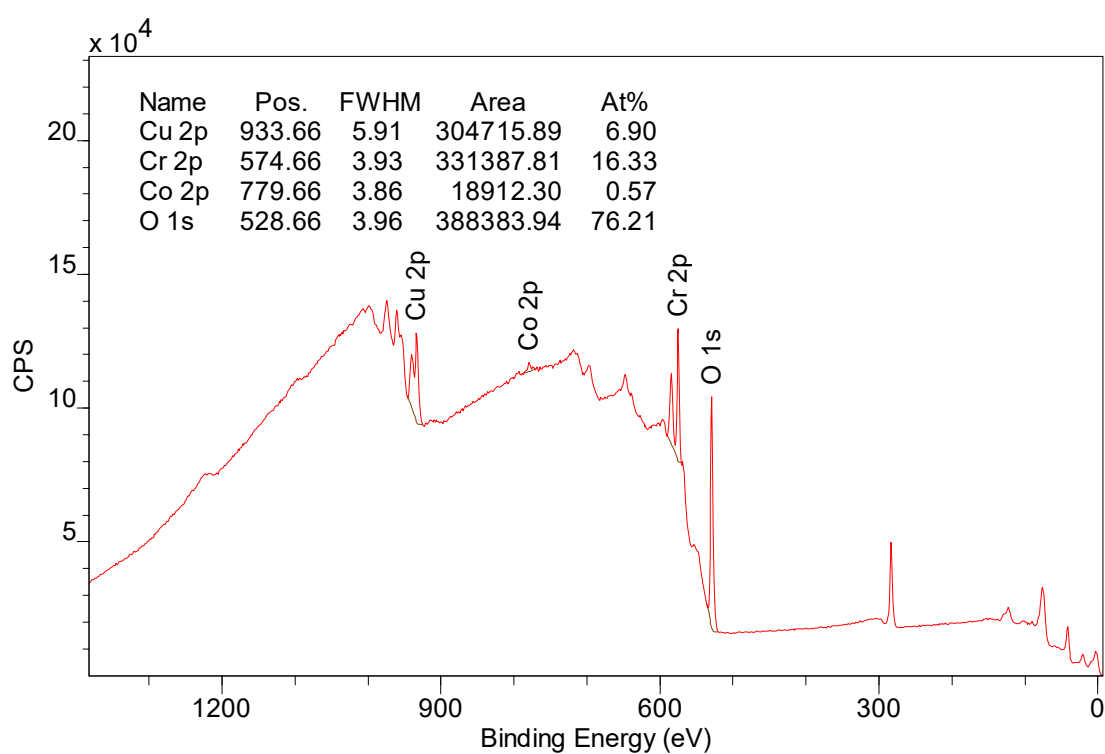


(b)

**Figure S3.** XRD analyses for MMO after its use in the MMO/PMS system. (a) XRD pattern and (b) Rietveld refinement.



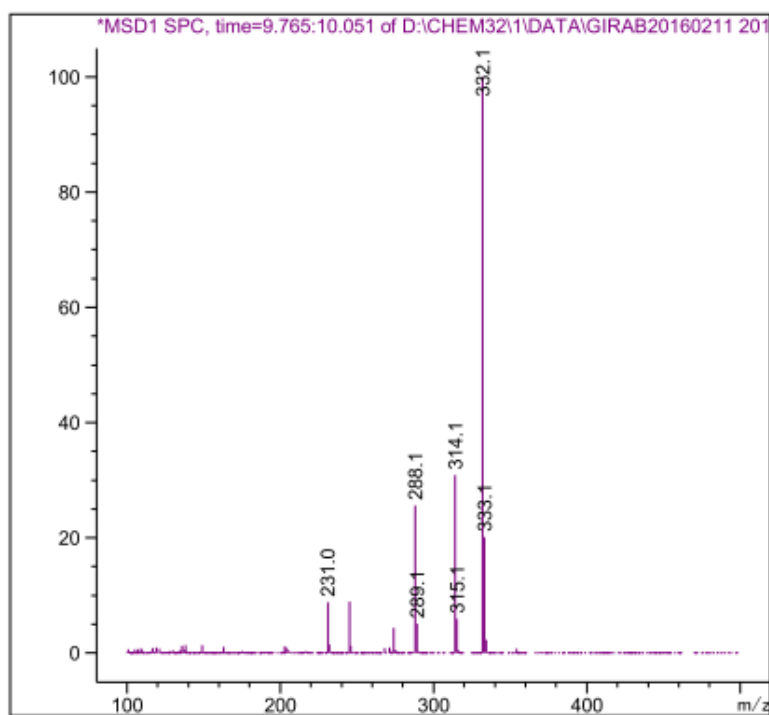
**Figure S4.** The N<sub>2</sub>-adsorption isotherm for used MMO.



**Figure S5.** XPS for MMO after its use in the MMO/PMS system.

**Table S2.** Comparison of textural properties of MMO before and after use in the MMO/PMS system.

Material	$V_{\text{micro.}} (\text{cm}^3 \text{g}^{-1})$	$V_{\text{total}} (\text{cm}^3 \text{g}^{-1})$	$S_{\text{BET}} (\text{m}^2 \text{g}^{-1})$	$S_{\text{ext.}} (\text{m}^2 \text{g}^{-1})$
MMO before use	0.00	0.230	36.8	36.8
MMO after use	0.00	0.176	29.2	29.2



**Figure S6.** MS spectrum of CIP.

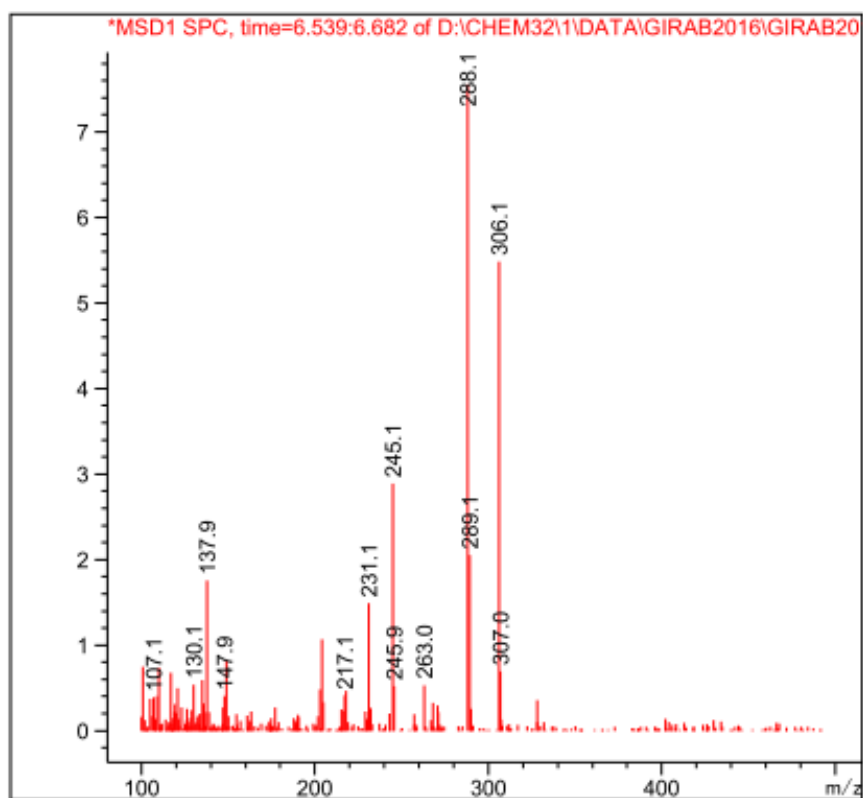


Figure S7. MS spectrum of P1.

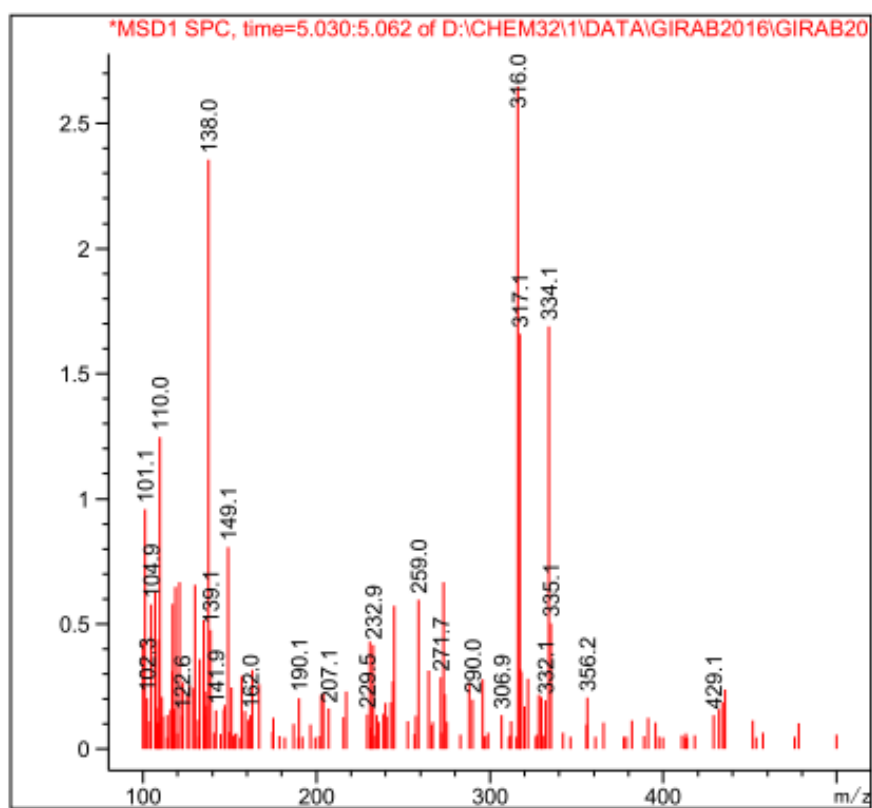


Figure S8. MS spectrum of P2.

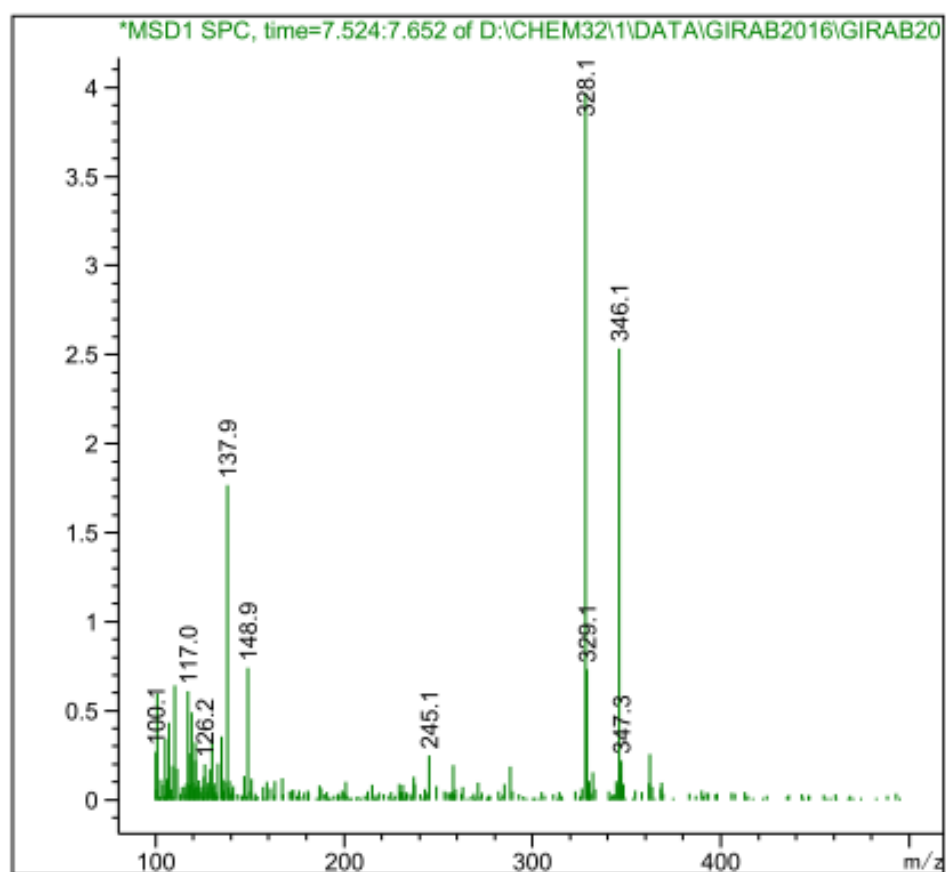
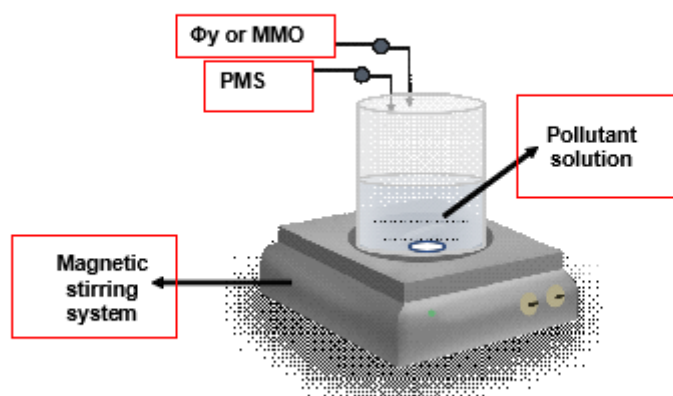


Figure S9. MS spectrum of P3.



**Figure S10.** Reaction system for tests of pollutants degradation.

**Table S3.** CIP and its primary transformation products in SMILES format.

Substance	SMILES
CIP	<chem>O=C(O)C1=CN(c2cc(c(F)cc2C1=O)N1CCNCC1)C1CC1</chem>
P1	<chem>O=C(O)C1=CN(c2cc(NCCN)c(F)cc2C1=O)C1CC1</chem>
P2	<chem>O=CN(CCN)c1cc2c(cc1F)C(=O)C(=CN2C1CC1)C(=O)O</chem>
P3	<chem>O=C(O)C=1C(=O)c2cc(O)c(cc2N(C=1O)C1CC1)N1CCNCC1</chem>