Electronic Supplementary Material (ESI) for Sustainable Energy & Fuels.

Chemical looping hydrogen storage and production: Use of binary ferrite-spinel as oxygen carrier materials

Min Li, Yu Qiu, Li Ma, Dongxu Cui, Shuai Zhang, Dewang Zeng*, Rui Xiao*

Key Laboratory of Energy Thermal conversion and control of Ministry of Education, School of Energy and Environment, Southeast University, Nanjing 210096, PR China

*Corresponding author. E-mail address: ruixiao@seu.edu.cn (Rui Xiao) & dwzeng@seu.edu.cn (Dewang Zeng)

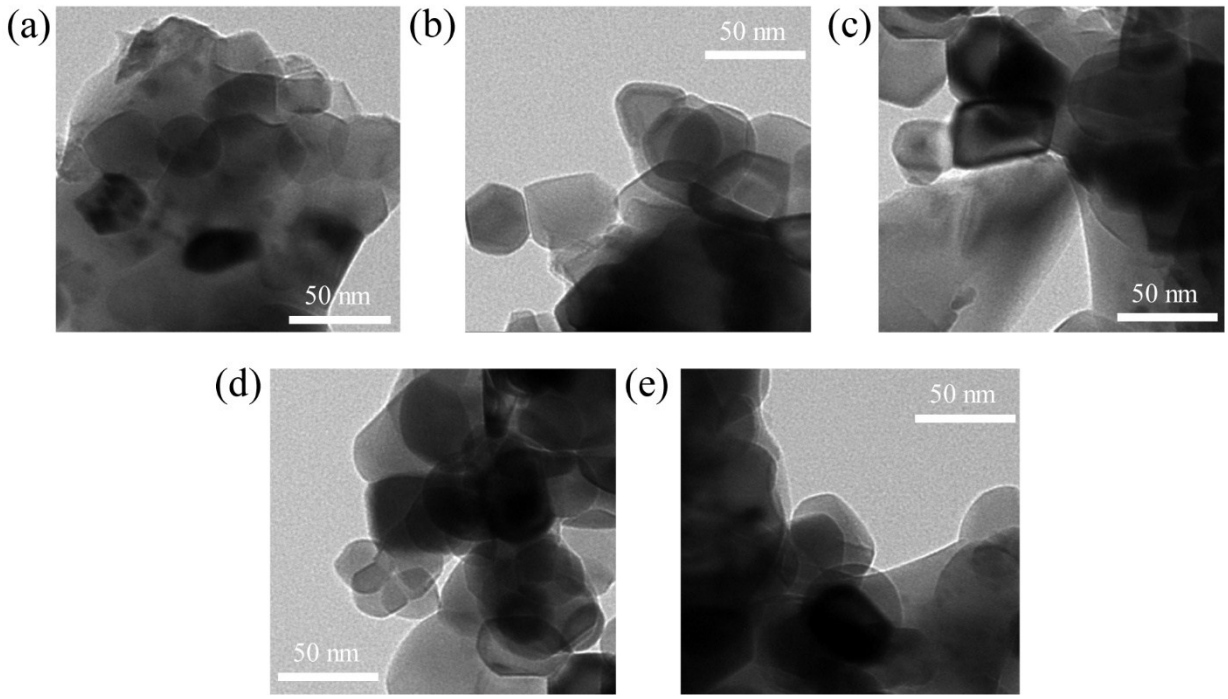
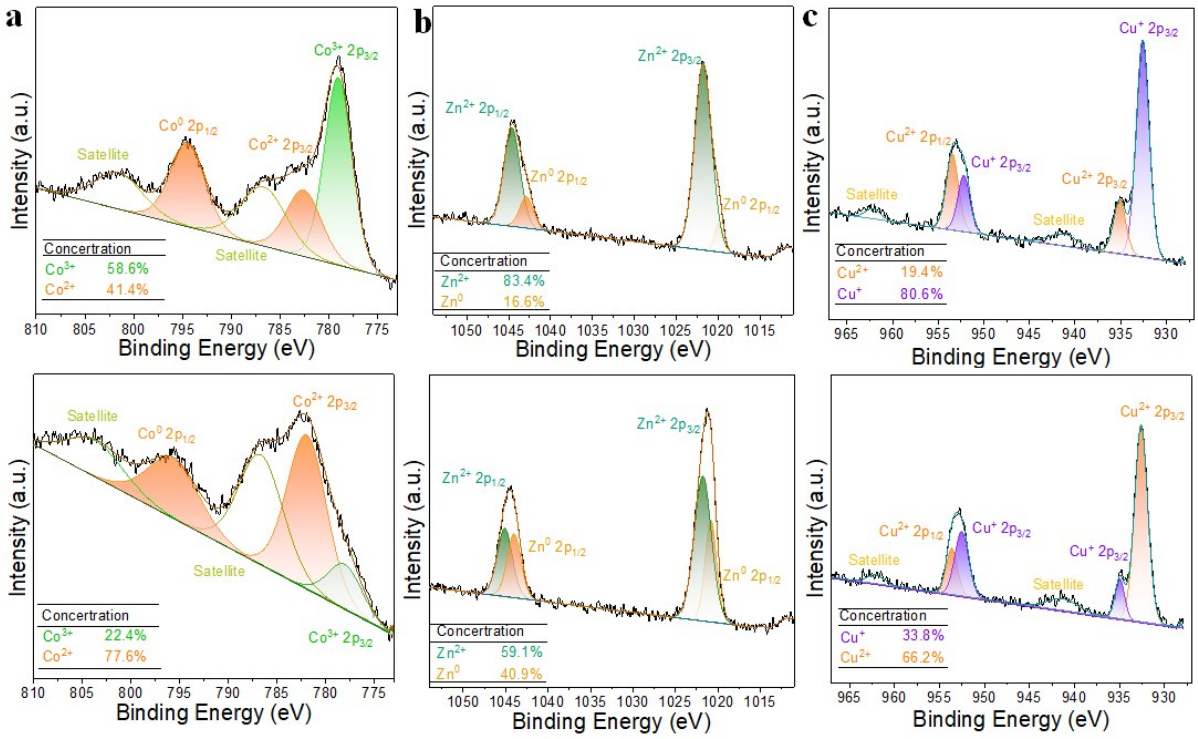


Figure S1. TEM images of the fresh materials (a) $Co_{0.25}Fe_{2.75}O_4$, (b) $Zn_{0.25}Fe_{2.75}O_4$, (c) $Cu_{0.25}Fe_{2.75}O_4$, (d) $Ni_{0.25}Fe_{2.75}O_4$ and (e)$Mn_{0.25}Fe_{2.75}O_4$.



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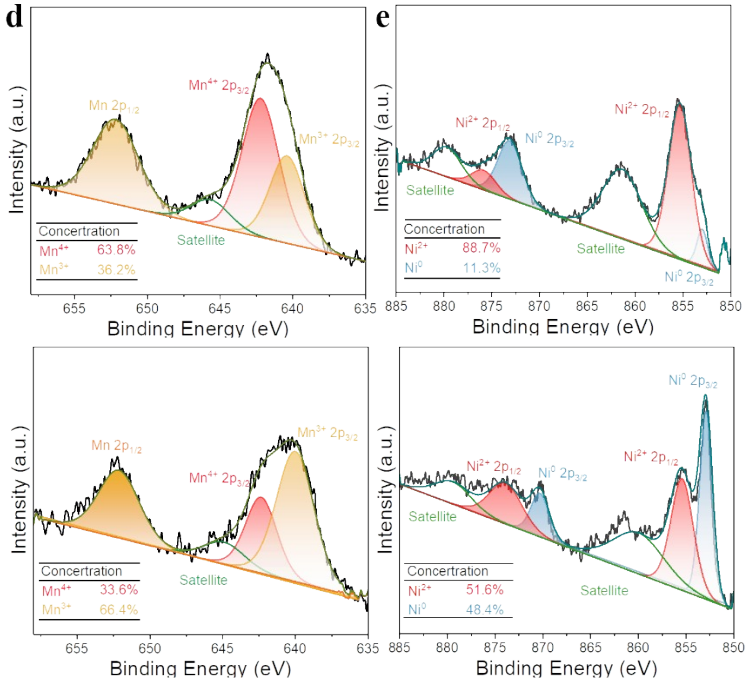

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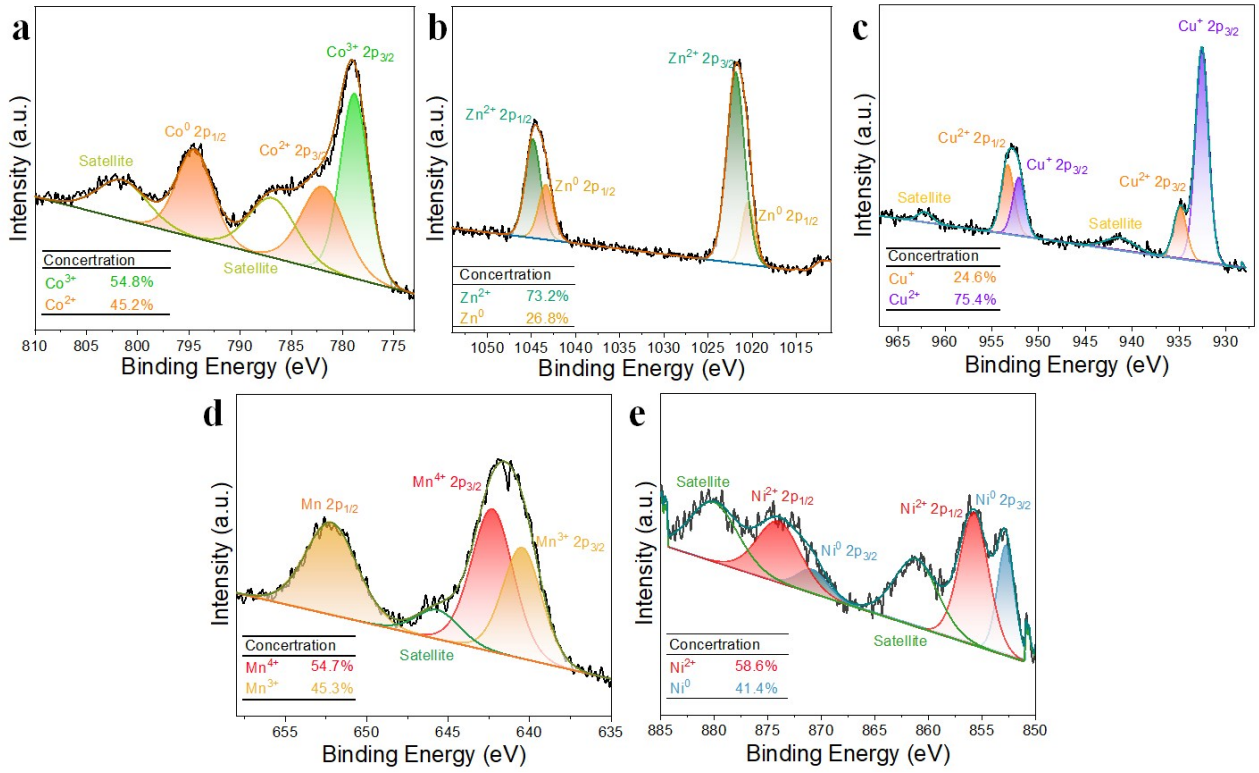
15 Figure S2. XPS results of the calcined and reduced materials. (a) $Co_{0.25}Fe_{2.75}O_4$, (b) $Zn_{0.25}Fe_{2.75}O_4$, (c)

16 $Cu_{0.25}Fe_{2.75}O_4$, (d) $Mn_{0.25}Fe_{2.75}O_4$ and (e)$Ni_{0.25}Fe_{2.75}O_4$.



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18 Figure S3. XPS results of the re-oxidized materials. (a) $Co_{0.25}Fe_{2.75}O_4$, (b) $Zn_{0.25}Fe_{2.75}O_4$, (c) $Cu_{0.25}Fe_{2.75}O_4$,

19 (d) $Mn_{0.25}Fe_{2.75}O_4$ and (e)$Ni_{0.25}Fe_{2.75}O_4$.

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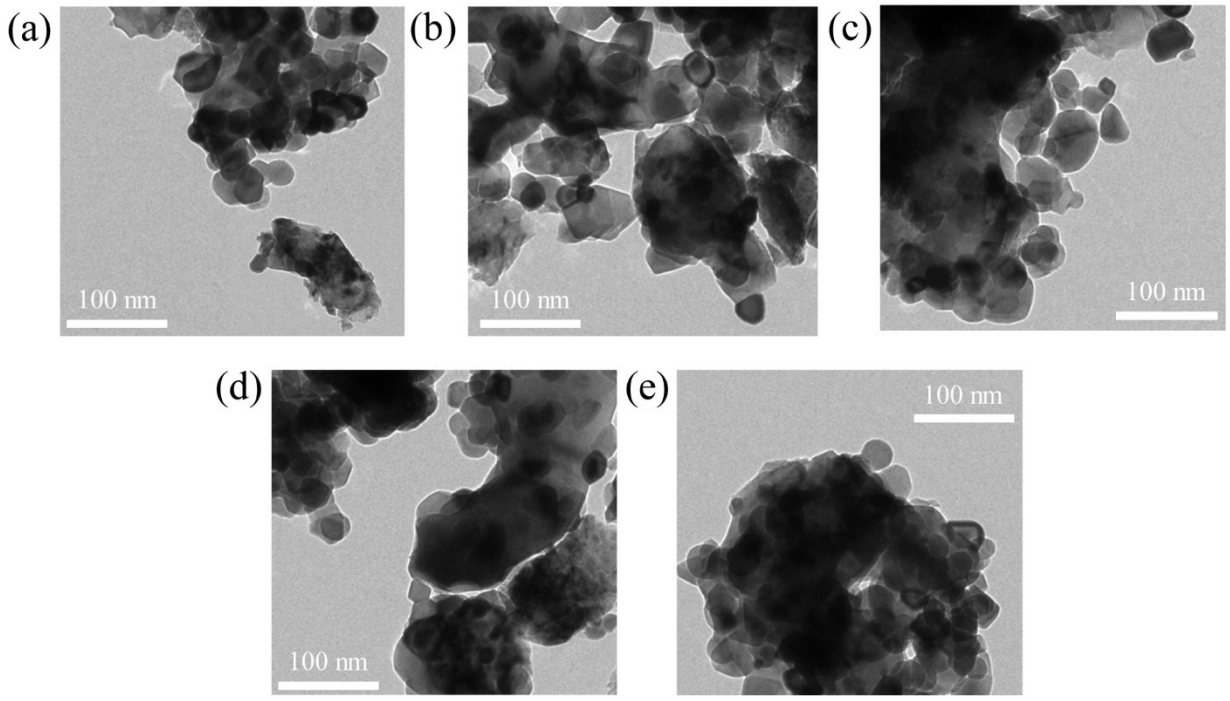

Figure S4. TEM images of the materials over 10 cycles (a) $Co_{0.25}Fe_{2.75}O_4$, (b) $Zn_{0.25}Fe_{2.75}O_4$, (c) $Cu_{0.25}Fe_{2.75}O_4$, (d) $Ni_{0.25}Fe_{2.75}O_4$ and (e)$Mn_{0.25}Fe_{2.75}O_4$.