

Article

# Physico-Chemical features of undoped and Fe/Cu doped Na<sub>0.67</sub>MnO<sub>2</sub> layered cathodes for sodium batteries

Marco Ambrosetti<sup>1</sup>, Maria Cristina Mozzati<sup>2</sup>, Alberto Cini<sup>3,4</sup>, Maria Fittipaldi<sup>3,4</sup>, Daniele Spada<sup>1</sup>, Michela Sturini<sup>1</sup>, Irene Quinzeni<sup>5</sup>, Marcella Bini<sup>1,6\*</sup>

<sup>1</sup> Chemistry Department, University of Pavia, Viale Taramelli 16, 27100 Pavia, Italy

<sup>2</sup> Physics Department and CNISM, University of Pavia, via Bassi 6, 27100 Pavia, Italy

<sup>3</sup> INSTM and Department of Physics and Astronomy, University of Florence, via Sansone 1, I-50019 Sesto Fiorentino, Italy

<sup>4</sup> INFN Sezione di Firenze, Firenze, Italy

<sup>5</sup> RSE – Ricerca sul Sistema Energetico, via R. Rubattino 54, 20134 Milano, Italy

<sup>6</sup> National Reference Centre for Electrochemical Energy Storage (GISEL) - INSTM, Via G. Giusti 9, 50121 Firenze, Italy

\* Correspondence: bini@unipv.it.

**Featured Application:** the paper results could be useful in the field of sodium ion batteries.

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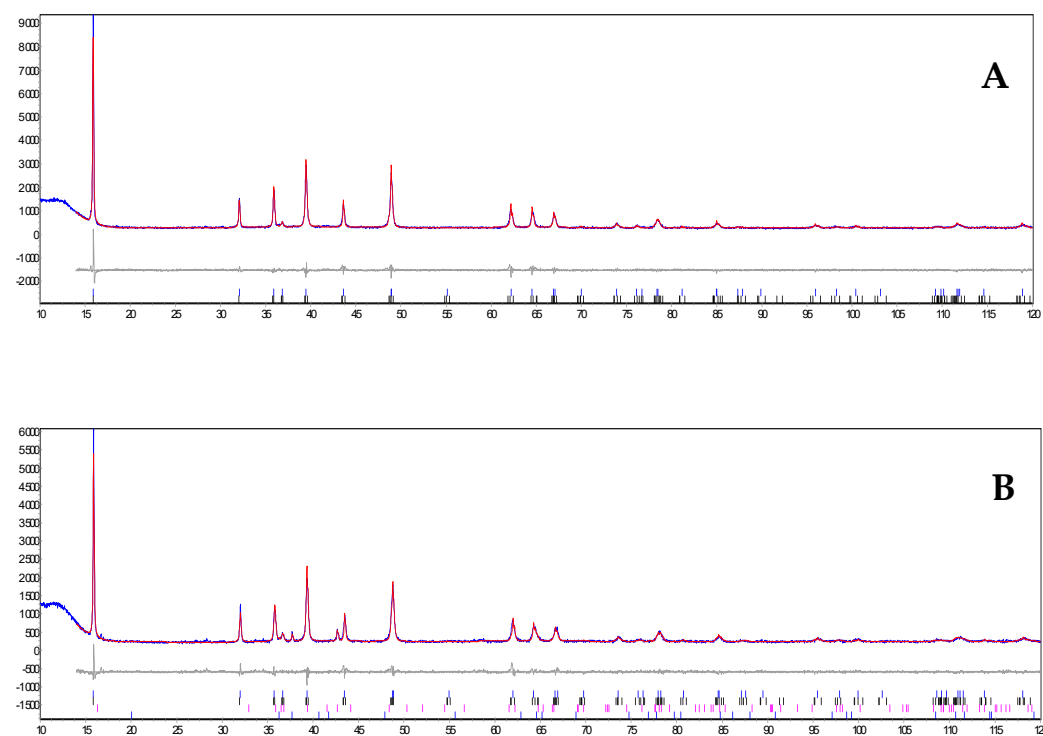
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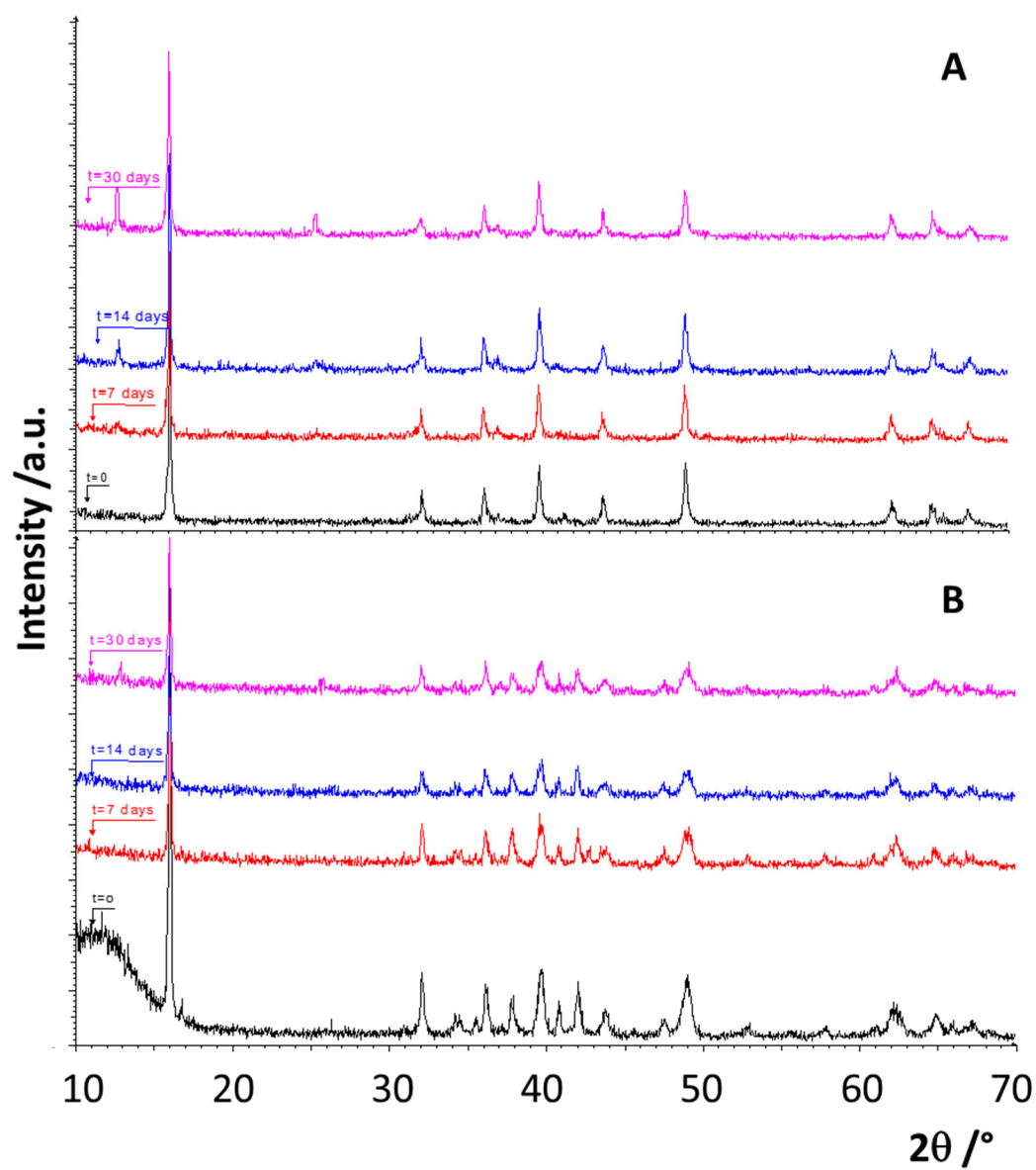
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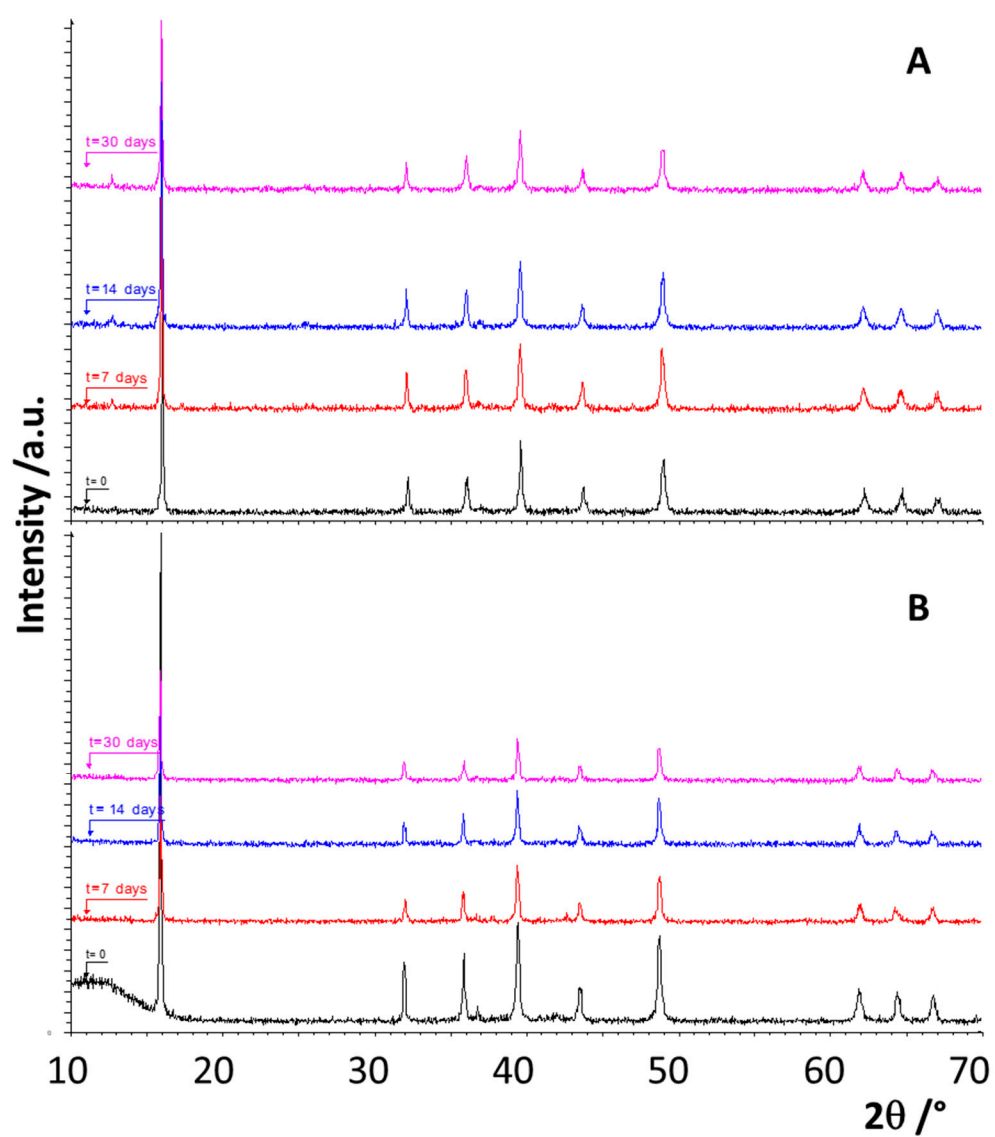
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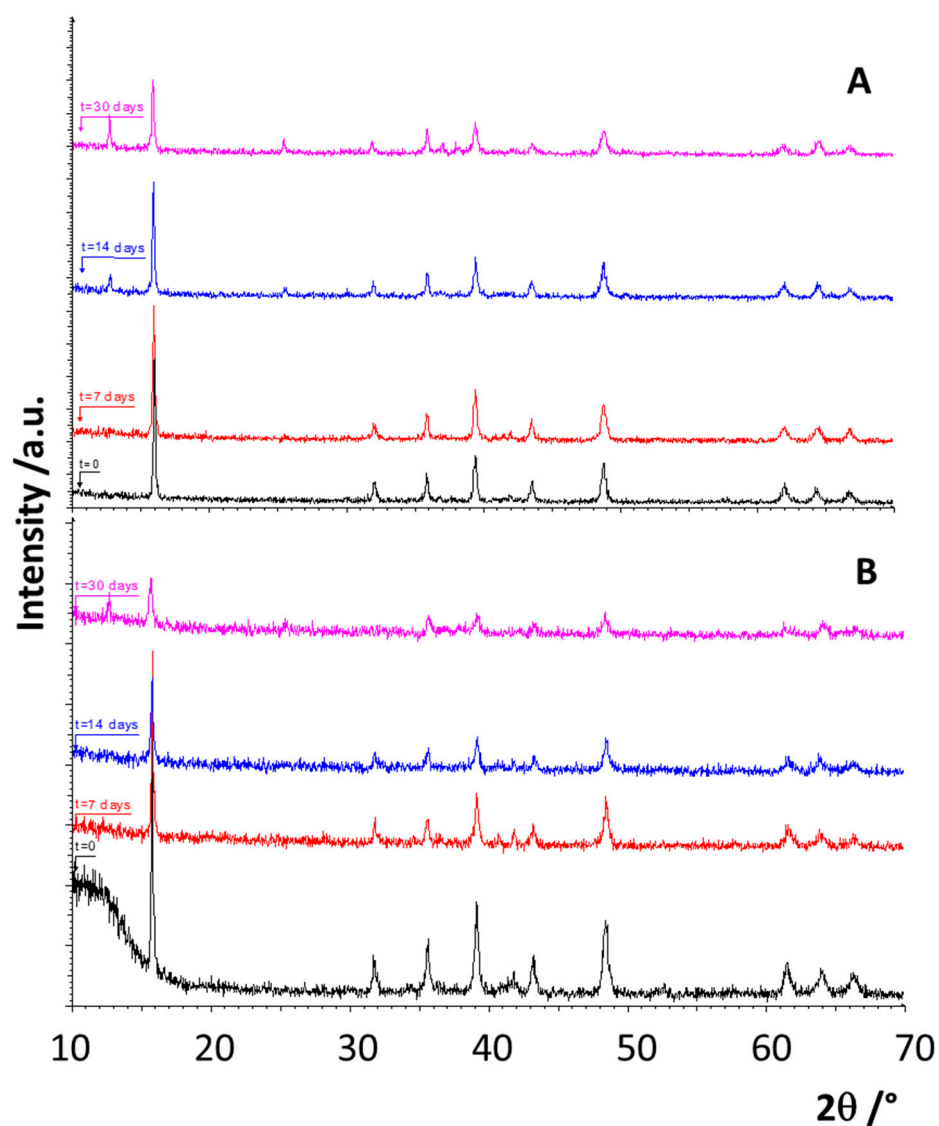
**Figure S1.** – Rietveld refinement of CuO<sub>2</sub> (A) and CuO<sub>2</sub>-Q (B) patterns. The experimental patterns (blue) are compared with the calculated ones (red); in the bottom the difference curve (grey) and the bars of the expected peak positions for the reflections of all the phases are also reported. Bars: P2 (blue), P'2 (black), O1 (magenta), O2 (blue at the bottom).



**Figure S2.** – XRPD patterns vs time of NMO (A) and NMO-Q (B) samples maintained in air to verify the structural stability.



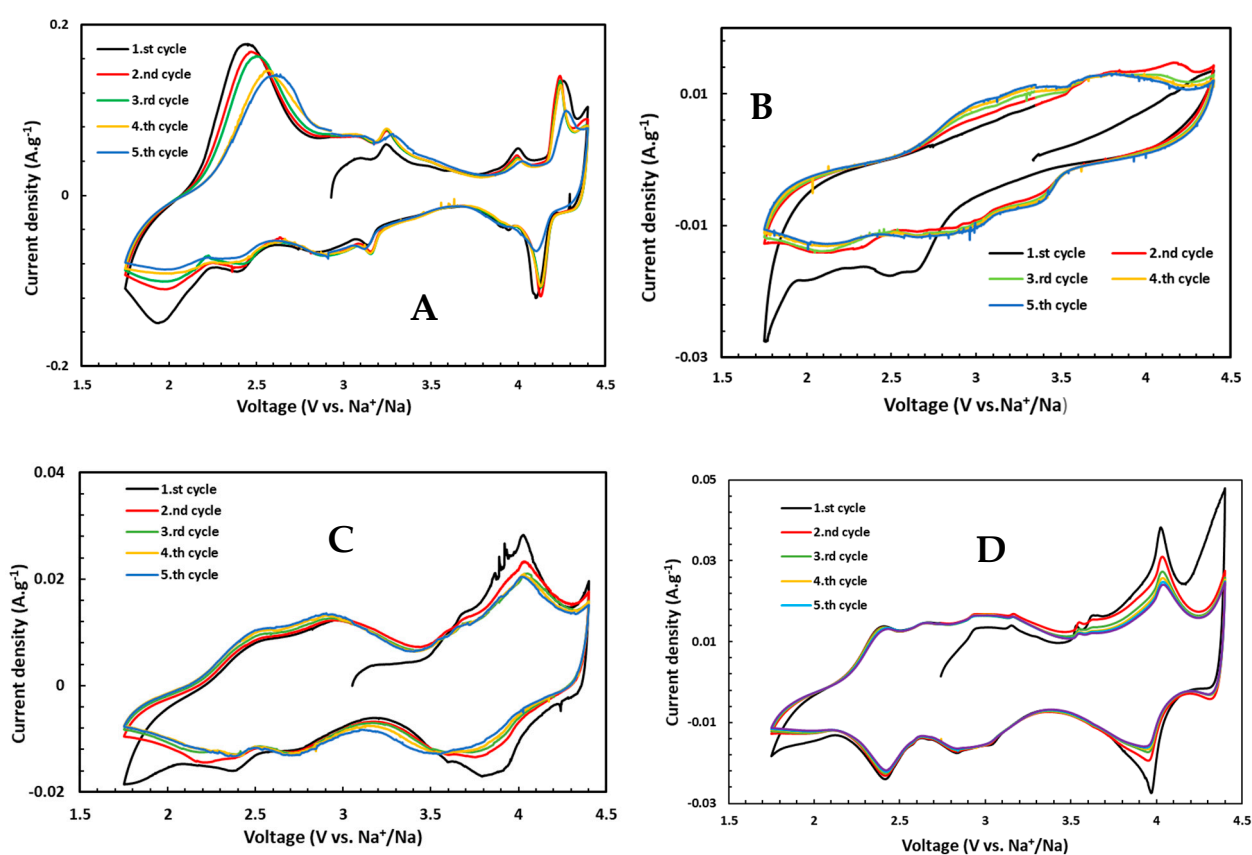
**Figure S3.** – XRPD patterns vs time of  $\text{CuO}_2$  (A) and  $\text{CuO}_2\text{-Q}$  (B) samples maintained in air to verify the structural stability.



**Figure S4.** – XRPD patterns vs time of FeO<sub>2</sub> (A) and FeO<sub>2</sub>-Q (B) samples maintained in air to verify the structural stability.

**Table S1.** – Results from ICP-OES analyses (Na 589.592 nm (Radial), Fe 238.204 nm (Axial), Cu 324.754 nm (Axial), Mn 257.610 nm (Axial); RSD %  $\leq 10\%$ ).

Sample	ICP composition	Na/Mn stoichiometric	Na/Mn from ICP
NMO	Na <sub>0.75</sub> Mn <sub>1</sub> O <sub>2</sub>	0.74	0.75
CuO <sub>2</sub>	Na <sub>0.75</sub> Mn <sub>0.77</sub> Cu <sub>0.2</sub> O <sub>2</sub>	0.925	0.974
FeO <sub>2</sub>	Na <sub>0.75</sub> Mn <sub>0.80</sub> Fe <sub>0.2</sub> O <sub>2</sub>	0.925	0.938



**Figure S5.** – Cyclic Voltammetry of (A) NMO, (B) NMO-Q, (C) CuO<sub>2</sub> and (D) CuO<sub>2</sub>-Q samples.