

## Na ordering imprints a metallic kagomé lattice onto the Co planes of Na<sub>2/3</sub>CoO<sub>2</sub>

Alloul H., Mukhamedshin I., Platova T., Dooglav A.  
*Kazan Federal University, 420008, Kremlevskaya 18, Kazan, Russia*

---

### Abstract

We report <sup>23</sup>Na and <sup>59</sup>Co nuclear magnetic (NMR) and quadrupolar resonance (NQR) studies for the  $x=2/3$  phase of the lamellar oxide Na<sub>x</sub>CoO<sub>2</sub>, which allowed us to establish reliably the atomic order of the Na layers and their stacking between the CoO<sub>2</sub> slabs. We evidence that the Na<sup>+</sup> order stabilizes filled non-magnetic Co<sup>3+</sup> ions on 25% of the cobalt sites arranged in a triangular sublattice. The transferred holes are delocalized on the 75% complementary cobalt sites which unexpectedly display a planar cobalt kagomé structure. These experimental results resolve a puzzling issue by precluding localized moments pictures for the magnetic properties. They establish that the quasi-ferromagnetic properties result from a narrow band connecting a frustrated arrangement of atomic orbitals, and open the route to unravel through similar studies the electronic properties of the diverse ordered phases of sodium cobaltates. Copyright © 2009 EPLA.

<http://dx.doi.org/10.1209/0295-5075/85/47006>

---