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EXAFS insights into the crystal-chemistry of nickel in tropical ultramafic areas: A survey at the molecular environmental level in New Caledonia.

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In this presentation, we will show how Ni K-edge EXAFS data from the Australian Synchrotron (Melbourne) and several facilities worldwide (ESRF-France, ELETTRA-Italy, SOLEIL-France, SSRL-USA) helped us to depict the crystal-chemistry of nickel in New Caledonia, the third nickel producer in the world thanks to its geological setting (one-third of the surface covered with lateritic regoliths resulting from the long-term weathering of peridotites under tropical conditions).

This survey at the molecular environmental level will start in the peridotites (the source of nickel) with data that help to better understand the formation of the hydrous Mg/Ni silicate deposits (i.e. known as garnierite) of New Caledonia.

It will follow in the lateritic regoliths with data that emphasize the vertical change of nickel speciation from Ni-bearing phyllosilicates in the bottom ultramafic bedrock towards Ni-bearing goethite in the upper lateritic horizons (Dublet et al., 2012; 2014; 2015).

Finally, it will end in the mangrove ecosystem with data that show the vertical change of nickel speciation from Ni-bearing goethite towards Ni-bearing pyrite when going from the oxic surface horizons towards the anoxic deep horizons of mangrove sediments located downstream lateritic regoliths (Noel et al., 2014; 2015).

Beyond the single case of New Caledonia, all these informations on the crystal-chemistry of nickel in ultramafic environments shall help building a sustainable exploitation of nickel laterites (60 to 70% of the world's Ni resources ; Butt and Cluzel, 2013).

Keywords

Nickel - Speciation - EXAFS - New Caledonia - Peridotites- Garnierites - Laterites - Mangrove -

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