

Synthesis of iron rich tri-octahedral clay minerals

Context and objectives

This project is proposed in the continuity of a collaboration project between Andra and IS2M with objective to synthesize defined quantities of iron rich tri-octahedral clay minerals with controlled structure and chemistry. Previous results have demonstrated the feasibility to obtain 1:1 and 2:1 type iron-rich clay minerals and to find optimum synthesis conditions using an approach of experimental design methodology. An improved understanding of condensation mechanisms in FeO-SiO₂ and FeO-SiO₂-MgO systems is sought in order to optimize the control of the chemistry of neo-formed phases. To reach project objective, the activities will be grouped in 5 tasks: (1) hydrothermal synthesis in FeO-SiO₂ system, (2) hydrothermal synthesis in FeO-SiO₂-MgO system, (3) detailed characterization of selected samples from tasks (1) and (2) using XRD, TEM, Mössbauer, FTIR and Raman spectroscopies, (4) purification and (5) upscaling.

The candidate will be part of the team “Transfers, Reactivity, Materials for Clean Processes” of the IS2M and the interaction with Andra will happen via status meetings.

Candidate

The candidate should hold a PhD degree in the field of material science or geochemistry, or similar. The knowledge about inorganic compound synthesis and their characterization is required. The knowledge about clay minerals or iron-bearing mineral synthesis and structure would be considered preferable. Other required skills include critical thinking, sense of organization and skills in synthesis, experimental data treatment, fluent English, scientific writing skills.

Contact and host laboratory

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Duration and gratification

15 months (starting on March 2021)

Approximately 2 000 EUR/month

Application deadline : until position filled