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Tuesday, 11th Oktober 2022, 16:00 s.t.

TU Wien, Institut für Angewandte Physik, E134

1040 Wien, Wiedner Hauptstraße 8-10

Yellow Tower „B“, 5th floor, SEM.R. DB gelb 05 B

The seminar will be also held as a Zoom Meeting

<https://tuwien.zoom.us/j/99445079914?pwd=d2E5SFBDdkkrQXk0YUg4ZDUzQWZaZz09>

ID meeting: 994 4507 9914

Passcode: zy6drsJy



Magnetism in iron-rich 2D phyllosilicates

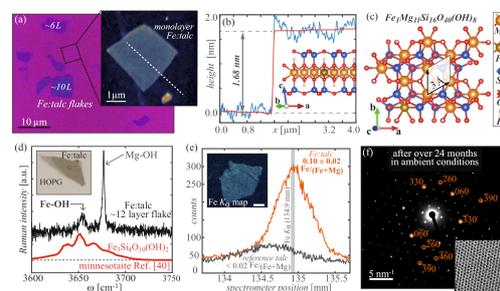
Driven mainly by the potential applications in spintronics, memory, and sensing, magnetic van der Waals materials have attracted attention in the last years. While the field focuses mainly on layered iodides/tellurides and diluted layered magnetic semiconductors, the class of magnetic phyllosilicates remain almost completely unexplored. The mineral class of phyllosilicates (layered silicates) counts more than 240 members, and many of these minerals are known to incorporate local magnetic moment bearing ions as Fe/Ni/Co which substitute Mg/Al sites in the central octahedral group. These naturally occurring magnetic van der Waals materials could serve as a novel and versatile platform for 2D magnetic insulators.

This talk will present our recent findings on layered magnetic minerals, mainly focusing on iron-rich talc (Fe:talc) [1] and iron-micas, including their iron end-members annite, and minnesotaite. These systems can serve as scaffolds to incorporate local magnetic moment bearing ions in high concentration. Capping silicate/aluminate tetrahedral groups in their monolayers enable ambient stability, while magnetic properties could be tailored in the central octahedral site of the monolayers.

References

[1] A. Matković, *et al.*, npj 2D Materials and Applications **5**, 2021, 94.

Figure 1



Iron-rich talc. (a) Fe:talc flakes exfoliated on SiO₂/Si (inset AFM topography of a monolayer). (b) step-edge cross-section with the side-view of the structural model. (c) top view of the Fe:talc-structure. (d) Raman spectra of the Mg/Fe-OH modes. (e) WDS quantitative analysis of Fe-concentration. (f) SEAD of a suspended flake after over two years of ambient storing.

All interested colleagues are welcome to this seminar lecture
(45 min. presentation followed by discussion).

Friedrich Aumayr
(LVA-Leiter)

Gareth Parkinson
(Seminar Chair)