

Isolating kerogeneous organic-walled microfossils from Precambrian fine-grained siliciclastic rocks

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ABSTRACT

Organic-walled microfossils can be preserved as carbonaceous compressions in fine-grained siliclastic rocks (shales and siltstones) through the geological record. Studying traces of life from this preservation window permits to document life evolution from the Archean through the Proterozoic^[1-2]. The first step consists on analyzes of possible microfossils *in situ* in the rock matrix (in thin section) to prove their endogenicity and syngenicity^[2]. However, taxonomical identification of these compressed microfossils require to extract them from the rock to expose their morphology and possible wall ornamentation, obscure in thin section. Over the years, we have developed an extraction method using acid maceration, modified from Grey^[3]. Carbonates are removed by hydrochloric acid (HCl, 35%) and silicates by hydrofluoric acid (HF, 60%). Neo-formed fluorides are removed by hot HCl. Centrifugation that could damage fragile fossilized forms and oxidation that could alter kerogenous wall chemistry and color are avoided. Great care is taken to avoid contamination.

The microfossil extraction permits to recover exquisitely preserved microfossils and to investigate the paleobiology of identified taxa, by analyzes of their morphology, wall ultrastructure, and wall chemistry. Microspectroscopy shows that the resilient wall chemistry is not altered by the chemical extraction^[4].

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[1]Javaux, E.J., Marshall, C.P., Bekker, A., 2010. Organic-walled microfossils in 3.2-billion-year-old shallow-marine siliciclastic deposits. *Nature* 463, 934-938

[2]Javaux EJ, and Lepot, K., 2018. The Paleoproterozoic microfossil record: implications for the evolution of the biosphere during Earth’s Middle-age. *Earth Science Reviews*, 176, 68-86.

[3]Grey, K., 1999. A modified palynological preparation technique for the extraction of large Neoproterozoic acanthomorph acritarchs and other acid-insoluble microfossils: Western Australia Geological Survey, Record 1999/10. 23.

[4]Baludikay B.K., François C., Sforza M. C., Beghin J., Cornet Y., Storme J.-Y., Fagel N. , Fontaine F., Littke R., Baudet D., Delvaux D. and Javaux E. J.; 2018. Use of different geothermometry methods on fossiliferous Proterozoic sediments to constrain thermal maturity of microfossils and sedimentary basins (DR Congo, Mauritania & Australia). COST ORIGINS Bertinoro, 19-24/04/2018.

I would like to have a **Poster** presentation.