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# Paw process: Assessing lipophilicity in mixtures of contaminants and radioactive waste

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The management of radioactive waste requires an accurate description of source terms and their behavior in natural or engineered barriers. Many radioactive waste involve organic contaminants, either included in the source term (e.g. 14C bearing lixiviates of graphite waste) or released simultaneously with radionuclides (e.g. degradation products of plastics or adjuvents in cementitious materials). The migration of organic compounds is largely investigated in cementitious and geological environments, as well as their effect on radionuclides confinement [1]. This behavior strongly depends on the lipophilicity of compounds, even for ionized species [2]. This property is therefore an interesting parameter to quantify, useful for further performance assessments. However, some hazardous waste and degradation mixtures are sometimes too complex to allow an exhaustive characterization of organic compounds and their lipophilicity. In this context, a new process "Partition of Aqueous Waste"(Paw) was developed. It quantifies and classifies organic compounds from unknown mixtures regarding their lipophilicity. The process uses sequential liquid-liquid partition equilibria. Its experimental validation will be illustrated with different kinds of analyses, e.g. organic carbon, UV-Vis, 14-C. Using a specific mathematical model, a "lipophilic"profile of the sample is obtained. Hence, the Paw process provides insights on the constituting solutes of the mixtures and their environmental behavior. Such data may be relevant for performance assessments in the context of radioactive waste storage.

[1] Fralova, L., Lefèvre, G., Madé, B., Marsac, R., Thory, E., Dagnelie, R.V.H., 2021. Effect of organic compounds on the retention of radionuclides in clay rocks: mechanisms and specificities of Eu(III), Th(IV), and U(VI). Appl. Geochem., 104859
[2] Guo, N., Disdier, Z., Thory, E., Robinet, J.-C., Dagnelie, R.V.H., 2021. Mobility of organic compounds in a soft clay-rich rock (Tégulines clay, France). Chemosphere, 275, 130048.

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