Geothermal brines: a promising unconventional lithium reserve for Europe

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The proliferation of new technologies for energy transition, particularly in electric mobility or energy storage, has significantly increased the demand for lithium, turning it into a critical raw material for Europe (CRM). Its demand has been predicted to rise up to 50 times in Europe by 2050. Lithium is a relatively rare element with geological features being a key factor for its distribution in the Earth crust. Europe is relatively poor of lithium and so alternative sources need to be found to ensure a secure domestic supply. Lithium is a lithophilic element; it forms silicates or oxides and is associated with the Earth's crust. It concentrates in hydrothermal fluids and can be found in volcanic areas, very common in Italy due to the geostructural and geodynamic setting. This study represents a comprehensive investigation of the potential of geothermal brine mining in Europe, covering both the geological and geochemical aspects. The aim is to locate the most suitable Li-enriched geological environments and to define an analysis, extraction and refining procedure for lithium exploitation from geothermal brines.