GMPV Seminar:

Tuesday 23 July 2024 at 4.30 pm, room U1-07 Marchetti

From waste to resource: microwave-assisted mineral carbonation at the service of Circular Economy

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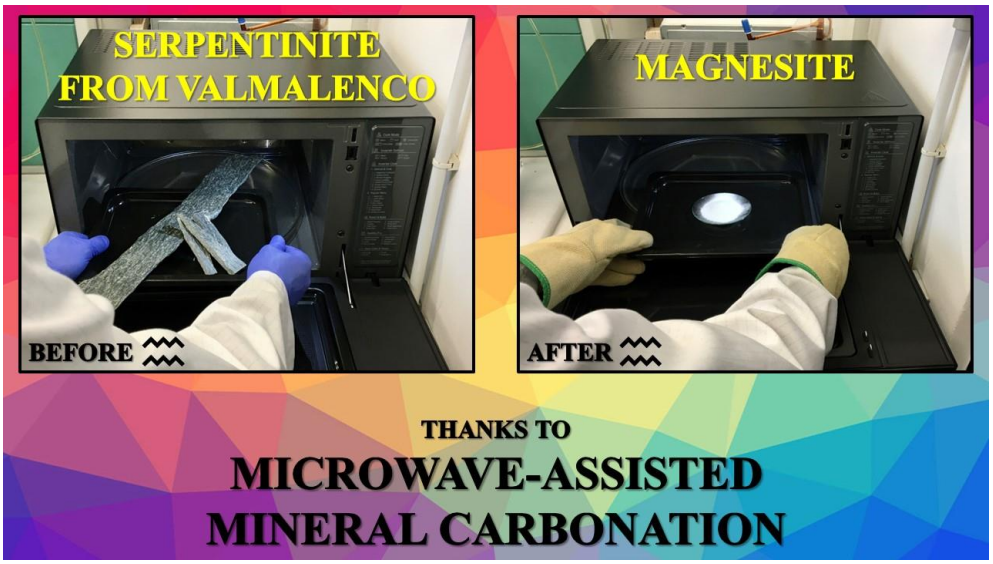
Carbon Capture Utilization and Storage (CCUS) has a crucial role in the Green Transition, participating to a more sustainable and neutral carbon industrial framework. Mineral carbonation (MC) refers to the reaction between CO_2 and magnesium and calcium rich minerals in aqueous environment, during which CO_2 is chemically converted into a stable and solid mineral form (usually a carbonate). ANTICARB project exploits captured CO_2 for the production of raw materials from wastes from serpentine quarries, in a perspective of Circular Economy, starting from MC of brucite [$Mg(OH)_2$], a model system of magnesium rich minerals. Though thermodynamically spontaneous for magnesium and calcium rich minerals, MC can be hindered by activation barriers. Microwaves (MW) overcome this limitation, promoting a faster reaction rate compared to conventional heating methods. Different combinations of temperature and reaction time, and chemical additives are investigated, to individuate the conditions of crystallization of magnesite [$Mg(CO_3)$] and magnesium hydroxide-carbonate hydrates (MHCH) nesquehonite [$Mg(HCO_3)(OH)\cdot 2H_2O$] and hydromagnesite [$Mg_5(CO_3)_4(OH)_2\cdot 4H_2O$], minimizing energy expenditure. Thanks to these MC products, considered secondary raw materials storing captured CO_2, the reduction of energy and environmental impacts of water-mediated MC can be achieved.



The seminars are open to all: students, PhD students, postdocs, and all the interested colleagues.