

## *The Olivine Foundation*

**The solution to combat climate change is actually in your hands now!**

**Olivine: A mighty mineral.**

**It sequesters CO<sub>2</sub> during its weathering process. Just by increasing its surface, the process of reducing CO<sub>2</sub>-levels can be accelerated.**

Fast & simple

- the worlds' most available mineral
- it transforms CO<sub>2</sub> into stable and innocent carbonates
- it captures more than its own weight

it is cheaper and more sustainable than alternative CO<sub>2</sub>-capturing methods

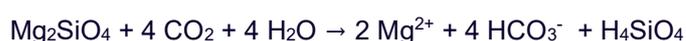
Nature has since millions of years kept the CO<sub>2</sub> -levels within bounds by means of weathering of olivine and other calcium and magnesium silicates. At present these mechanisms cannot cope with the increased input of CO<sub>2</sub> caused by the burning of fossil fuels. In order to reach a new balance we must increase the rate of weathering as well. This can be done by mining abundantly available and easily weathering rock types like olivine, by grinding them, and spreading the powder in a thin layer over large areas of land in wet tropical climates, where weathering rates are highest, or in shallow seas. The reaction that is relevant to combat climate change is the transformation of CO<sub>2</sub> into bicarbonates in solution. Ultimately these bicarbonate solutions will reach the oceans and precipitate as innocent and stable carbonate sediments.

In practice the speed of this reaction goes 10 to 100 times faster than indicated by laboratory data from abiotic chemical-only experiments, because it is enhanced by fungi and lichens playing an important role in the dissolution of minerals. Whereas laboratory tests show a weathering rate of a few tenths of microns per year, the weathering of rocks in nature takes place with a speed of approximately 10 microns per year and the weathering of loose mineral grains is estimated to be at a rate of 20 microns per year. 1 tonne of olivine sequesters 1,25 tonnes of CO<sub>2</sub>.

Advantages en preconditions

A number of large open pit olivine mines should be started in different countries in the tropics, considering the following:

- Weathering goes fastest in humid tropical climates.
- Wages in developing countries are low, so mining is relatively cheap.
- It will bring employment for millions, and boost the economies of developing countries.
- To reduce transport costs, distances from the mine to the point of use should be limited to 300 km, and transport should be preferably by boat.
- Large mines (> 100 million tonnes/year) profit from the economy of scale.
- Many nickel lateritic caprocks are mined (e.g. in New Caledonia, Philippines, Indonesia, Cuba, Brazil). These mines are favourable locations to mine the underlying dunites for olivine as well. This will minimize the ecological damage because it will not be necessary to clear forest to start a new mine, and all the required infrastructure for mining is already in place.
- Cheap and sustainable: This method of capturing CO<sub>2</sub> is cheaper than other capturing methods (€15-20 per tonne of CO<sub>2</sub>), during the total life cycle from production of fine grains to the sequestration of CO<sub>2</sub> the process footprint creates only 4% of CO<sub>2</sub>.



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**It is our firm belief that, when applied on a world scale, our approach will provide**

*the most viable way to reduce the CO<sub>2</sub>-content of the atmosphere  
and counteract the acidification of the oceans.*

It is therefore amazing how much funds are spent to develop other methods of CO<sub>2</sub>-reduction and how little for the development of olivine based alternatives.

In order to

- further develop and research possible olivine applications for CO<sub>2</sub>-reduction on practical use
- bring olivine applications to the attention of policy makers, governmental institutions and companies
- promote the commercialisation of such applications

we established in 2009 the *Olivine Foundation for CO<sub>2</sub>-reduction*.

The Olivine Foundation for CO<sub>2</sub>-reduction aims to reach its target by

- Executing or having executed research projects to assess the practical usability of olivine applications
- Obtaining in as far as possible patents on such applications
- Promoting the public or industrial use of olivine applications by making the research activities public and providing licenses for the use of it
- Bringing the olivine options under public attention
- Maintaining contacts with “Friends of the Olivine Foundation” through a regular newsletter
- Obtaining funding for the execution of these activities

The Foundation is a “not for profit” entity.

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