

The Ball Milling Process

A **Planetary Ball Mill** will be used during the execution of the CO2NOR Project (Fig. 1). The name of this mill is attributed to the planet-like movement of its vials. The latter are arranged on a rotating support disk and a special mechanism causes them to rotate around their own axes. The centrifugal force produced by the vials rotating around their own axes and that produced by the rotating support disk both act on the vial contents (i.e. material and grinding balls; see Fig. 2).



Fig. 1. The planetary ball mill that will be used during the CO2NOR Project (Fritsch Pulverisette 6 planetary mono mill).

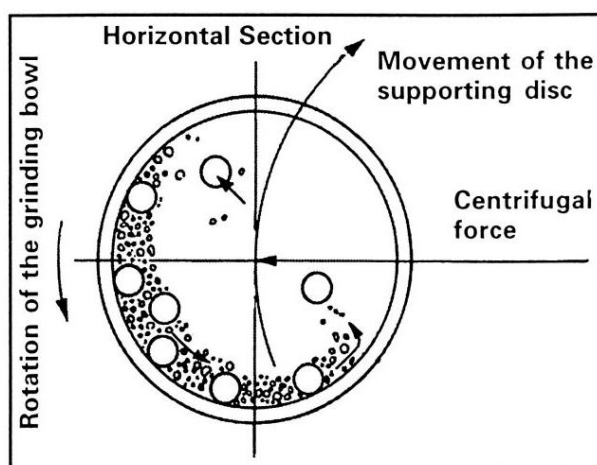


Fig. 2. The motion of balls in a planetary ball mill (from Suryanarayana, 2001).

Different milling parameters will be tested during the CO2NOR Project, including ball to powder weight ratio, ball size, type and quantity of process control agent – PCA (dry or wet milling), rotation speed, and cycle of milling. Special emphasis will be placed on the PCA that will be used (e.g. see Fig. 3), which influences the degree of agglomeration in the ball-milled materials (Suryanarayana, 2001; Rigopoulos et al., 2015a,b).



Fig. 3. Rock material after 1 h of wet ball milling using 50 wt% ethanol as PCA.

References

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- Rigopoulos, I., Vasiliades, M.A., Petallidou, K.C., Ioannou, I., Efstathiou, A.M., Kyratsi, Th., 2015b. A method to enhance the CO₂ storage capacity of pyroxenitic rocks. *Greenhouse Gas. Sci. Technol.* 5, 1-14.
- Suryanarayana, C., 2001. Mechanical alloying and milling, *Prog. Mater. Sci.* 46, 1-184.