



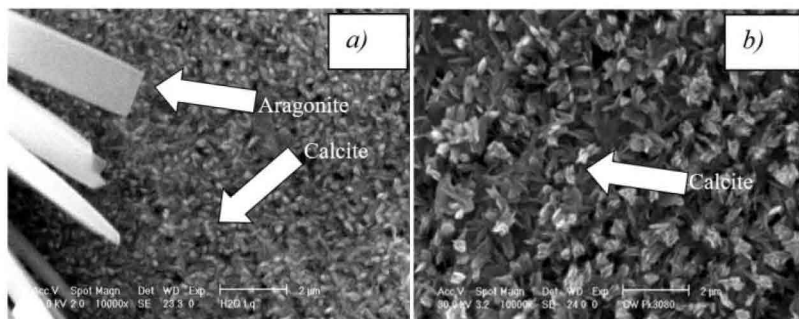
## ***Reduction of calcareous scale formation by PURAK magnetic polarizers***

The formation of calcareous scale in waters used both for domestic and industrial use, involves maintenance costs depending on the characteristics of the water and its chemical-physical conditions of use. To reduce the formation of such incrustations, before use the water is passed through Purak magnetic polarizers (produced by AMS s.r.l.). The type of magnetic device, to be used to maximize the reduction of encrusting deposits, requires knowledge of chemical characteristics of water such as salinity, temporary and permanent hardness, pH, both charge and ionic type. In addition it is also useful to know the flow rate, the temperature of both entry and use of water.

The effectiveness of the Purak device is determined by comparing the characteristics of surface calcareous deposits that are formed both with untreated water and treated with the selected magnetic polarizer. It must be pointed out that calcium carbonate precipitates not only on the surfaces containing the water but also in the bulk of the aqueous solution. In general, the calcium carbonate that is deposited on the surfaces is mainly present in the form of calcite with high aptitude to form scale deposits due both to crystalline habitus and nanometric dimensions of calcite. On the contrary, the calcium carbonate that precipitates in the bulk of the solution crystallizes mainly in the form of aragonite characterized by a spherulitic crystalline habitus and with micrometric dimensions and therefore with a minimal tendency to form surface scale deposits.

The water treatment with pre-selected PURAK magnetic polarizer allows two major advantages compared to untreated water:

- a) *The mass of calcium carbonate deposited on surfaces in the form of calcite is considerably reduced, favoring the precipitation of aragonite in the bulk of the aqueous solution*
- b) *Significant increase in the crystalline dimensions of less reactive calcite precipitated on surfaces with lower aptitude to form scale deposits.*



SEM micrographs of calcite deposits on surfaces formed at 80 °C by non-magnetized (a) and magnetized water (b) with PURAK polarizer.

*These two results scientifically justify the considerable reduction of scale deposits on surfaces by treating the water with a selected PURAK magnetic polarizer.*

A handwritten signature in dark ink, appearing to read "Maria Cristina Mascolo".