



## **Low and room temperature magnetic features of the traffic related urban airborne PM**

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We used magnetic measurements and analyses - such as hysteresis loops and FORCs both at room temperature and at 10K, isothermal remanent magnetization (IRM) vs temperature curves (from 10K to 293K) and IRM vs time decay curves - to characterize the magnetic properties of the traffic related airborne particulate matter (PM) in Rome.

This study was specifically addressed to the identification of the ultrafine superparamagnetic (SP) particles, which are particularly sensitive to thermal relaxation effects, and on the eventual detection of low temperature phase transitions which may affect various magnetic minerals.

We compared the magnetic properties at 10K and at room temperature of Quercus ilex leaves, disk brakes, diesel and gasoline exhaust pipes powders collected from vehicles circulating in Rome.

The magnetic properties of the investigated powders significantly change upon cooling, and no clear phase transition occurs, suggesting that the thermal dependence is mainly triggered by the widespread presence of ultrafine SP particles.

The contribution of the SP fraction to the total remanence of traffic related PM samples was quantified at room temperature measuring the decay of a IRM 100 s after the application of a saturation magnetic field.

This same method has been also tested at 10K to investigate the temperature dependence of the observed time decay.