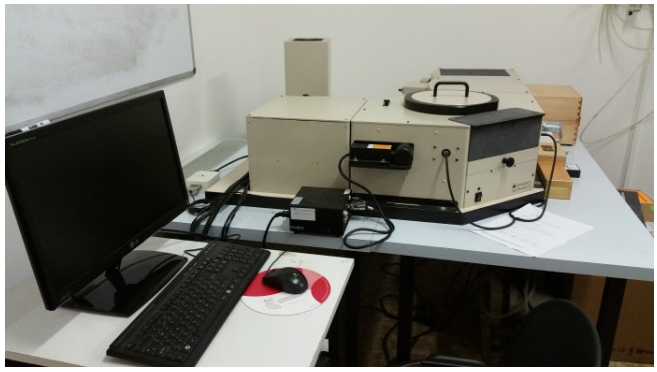
1. ***SPECTROPHOTOMETER (Jasco)***

Spectrometer for measuring absorption spectra in the UV/Vis/NIR range in both transmittance and absorbance mode. The apparatus is also equipped with an integrating sphere set-up for measuring absorption spectra in diffuse reflectance mode. It also provides UV-Vis spectra recording mode under diffuse reflectance condition for powdered samples ($BaSO_4$ as reference materials).

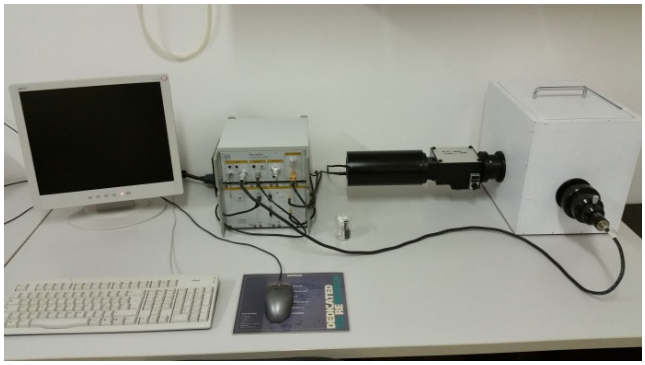
2. ***SPECTROFLUORIMETER (Edimburgh Instruments)***

Spectrometer for steady-state photoluminescence measurements on both liquid and solid samples, equipped with a Xenon lamp as the excitation source and two detectors (a PMT for the detection in the UV-Vis between 200-870 nm and an InGaAs for the detection in the NIR between 900-1700 nm). A 532-nm laser excitation source is also coupled for measuring Raman spectra. An integrating sphere set-up is also present for the determination of emission quantum yields.



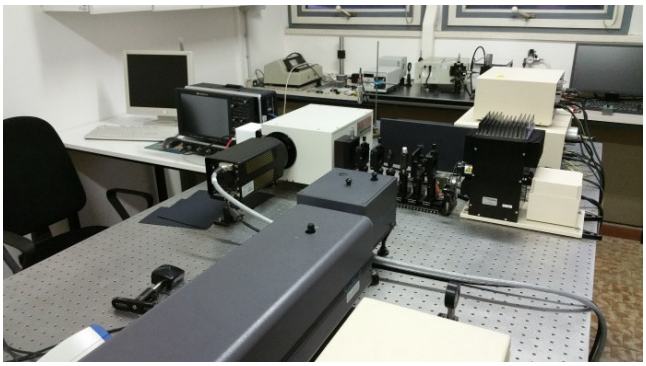
3. ***TIME-CORRELATED SINGLE-PHOTON COUNTING (PicoQuant)***

The TC-SPC is a time-resolved emission technique for the determination of the lifetimes of emitting excited states. The apparatus is equipped with four different LED excitation sources (280, 380, 460, and 600 nm) with a 500-700 ps pulse width. The limit of detection is strictly dependent on the excitation source used and is estimated as ca 250 ps.



4. ***LASER FLASH PHOTOLYSIS***

This technique is used for time-resolved emission and absorption measurements with a time resolution from 8-10 ns up to ms. The excitation source is a Nd:YAG laser (*Continuum Surelight II*, 1064 nm) equipped with frequency doubled (532 nm), tripled (355 nm), or quadrupled (266 nm) options and a xenon lamp is used as the probe beam. Two detectors are present, depending on the type of experiment: a PMT for kinetic measurements at a fixed wavelength and a CCD camera (*Princeton Instruments*) for spectral detection at fixed time delays.



5. ***ULTRAFAST SPECTROSCOPY***

This pump-probe technique is used for time-resolved absorption measurement with a time resolution between ca 200 fs and 2 ns. The apparatus is based on the *Spectra-Physics Hurricane* Ti:sapphire laser source and the *Ultrafast Systems Helios* spectrometer. The excitation beam can be varied over the whole visible spectrum using an optical parametric amplifier (*Spectra Physics OPA*), while the analysis beam is created by white light supercontinuum generation on a sapphire plate (useful wavelength range 450-750 nm).

6. ***MICRO GC (Agilent)***

Model 490 micro gas chromatograph equipped with a molecular sieve column and a thermal conductivity detector (TCD) used for identification and quantification of gases such as hydrogen, oxygen, and nitrogen.

7. ***ATOMIC FORCE MICROSCOPY (Digital Instrument Veeco)***

The NanoscopeIIIa MultiMode Scanning Probe Microscope is a versatile, high-resolution imaging tool that performs AFM techniques for surface characterization of properties, shapes and sizes. A powerful software and a compact hardware design enable the Nanoscope AFM to easily acquire data from micro- to atomic-scale images. Three options are available for the measurements: contact mode AFM, tapping mode AFM, and Non-contact mode AFM.

8. ***PARAMAGNETIC RESONANCE SPECTROMETER (Bruker)***

This instrument works in the range of temperatures starting from 90K up to about 450K. It has a source that generates a variable magnetic field and a source of fixed microwave wavelength. With this instrument one can study coordination environment and oxidation state of transition metal ions in coordination compounds. Moreover, (photoinduced) reaction mechanism can be studied detecting radical species formed during a reaction by the epr spin trapping technique.

9. ***GASCHROMATOGRAPHS (Agilent)***

Traditional GC with capillary columns of different nature of the stationary phase and a FID detector. It is used for the qualitative and quantitative analysis of substrates and stable products of a (photo)catalytic reaction. A second GC is equipped with a detector measuring CO_2. This kind of equipment allows the quantitative analysis of carbon dioxide giving indication about mineralizing properties of the (photo)catalytic systems.