Activity/Experience	Instrument/system	Student action
Chemical-physical characterization of 0D, 1D or 2D nanomaterial surfaces.	XPS (X-ray Photoelectron Spectroscopy) & UPS (UV-ray Photoelectron spectroscopy)	Sample preparation and loading into the analysis pre-chamber. Supervision of measurement and identification of the chemical composition through consultation of databases provided by the teacher. Processing of the acquired experimental data.

## Raccolta fotografica strumenti/apparecchiature



Activity/Experience	Instrument/system	Student action	
Calculation of the Isosteric Heat of Adsorption from Volumetric Isotherms on Nanoporous Materials	Instrument for Volumetric Measurements of Gas Physisorption	Use of Excel for Fitting Volumetric Isotherms with Different Models (e.g., Langmuir, Toth, Sips). Application of the Clausius–Clapeyron Equation for the Calculation of the Isosteric Heat of Adsorption.	Team n'3 210 Counts d = 7.0 mg cm A = 0.715 cm <sup>2</sup> 4 = 0.715 cm
Calculation of the Heat of Adsorption from Spectroscopic Measurements (FT-IR) of Molecules (e.g., CO <sub>2</sub> ) Adsorbed on Nanoporous Materials	FT-IR Spectrometer	Use of Excel for Fitting Optical Isotherms with the Langmuir Model and for Calculating the Heat of Adsorption from Variable Temperature IR (VT-IR) Spectroscopy Measurements	
Thinnest Wafer Tournament: Preparation and FT-IR Analysis of Thin Pellets of Nanoporous Materials	Hydraulic Press, Balance, and FT-IR Spectrophotometer	Preparation of Pellets for Transmission FT- IR Spectroscopy. Density Measurement. Acquisition of Spectra of Degassed Pellets. Correlation Between Pellet Density and Spectrometer Counts.	<image/>