Bulk material preparation

	Name	Picture	Description	Site	Responsible
1	Experimental set-up for chemical synthesis of metallic nanoparticles	 	The composite system consists of chemical hood, reactors, thermostatic bath and centrifuge. This experimental set-up, together with an air cleaning system, assures the necessary conditions for the production of metallic nanoparticles by chemical synthesis, as well as their eventual dispersion inside a polymeric matrix.	NA	Iannotti

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2	Gas flux furnace		Cylindrical chamber with adjustable tilt. It is possible to insert 25 up to 50 mm tube. Working temperature: 100 - 1200 °C. Automatic temperature display. Quartz tube and holder for 5x5 e 10x10 mm2 substrates. The furnace is used only for surface treatments of inorganic crystals. For materials other than SrTiO3 e NdGaO3 it is necessary to buy a suitable quartz tube. The processes are carried out under pure oxygen flux and need 200 bar oxygen tank.	NA	Salluzzo
3	Substrates treatment room		Room equipped for substrates treatment and wet etching for litography and soft-litography processes.	NA	Cassinese
4	Substrates treatment room		The planetary ball mill is characterized by very fast and effective comminution. Ideal for lossless comminution down to extremely high levels of fineness < 0.1 µm. The grinding can take place dry, in suspension or under inert gas, depending on the application. They are also well suited for mixing and homogenising emulsions and pastes or for mechanical alloying. Max. sample quantità 1-500 gr. Main disc speed: 10 - 360 rpm. The FRITSCH Vibratory PULVERISETTE 0 grinds your sample through impact and friction by which the mortar vibrates electromagnetically and the grinding material transfers the vibrations to the grinding ball. At the beginning of the grinding, the comminution of the coarse particles is achieved by the impact effect of the grinding ball. Next, the fine particles are comminuted through friction by the tumbling motion of the grinding ball as the vibrations subside. The impact energy of the grinding ball is freely adjustable thus, allowing it to be precisely adapted to the sample being ground.	GE	Vignolo
5	Liophylizator		Freeze-drying system, with a condensation chamber at -55 °C as cold trap, offers the most economical choice when the samples to be dried only contain water. Drying capacity of 3.5kg per 24 hours with a maximum condenser capacity of 7kg. It is therefore, suitable for fast freeze drying of larger aqueous samples.	GE	Vignolo
6	Hydraulic presses for targets preparation		2 presses with three different pellet maker. Pellet diameter available: 1,2,3 cm and up to 2-3 cm in thickness. It is possible to act under controlled atmosphere and vacuum.	GE	Vignolo
7	Glove box interfaced at furnace for prepation under controlled atmosphere		The glove box permits to work under controlled atmosphere, being directly connected to a furnace it is possible to do several heat treatment under controlled atmosphere.Max temperature allowed: 1000°C. The oxygen amount is monitored by a sensor and the atmosphere is manually maintained.	GE	Vignolo

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8	Glove Box		Glove-box working under a controlled atmosphere with H2O and O2< 1ppm.	GE	Martinelli
9	Groove rolling machines		Set of groove rolling machines for the production of wires with a diameter in the 22-1.8 mm range.	GE	Malagoli *
10	Drawing machines		Set of drawing machines for wire deformation starting from a diameter of 22mm down to a diameter of 1.5mm. In particular the set is composed by two linear drawing machines 20 and 7 m in length respectively and a bull block for long lengths.	GE	Malagoli *
11	Flat rolling machine		Flat rolling machine for tapes production starting from a thickness of 3 mm.	GE	Malagoli *
12	Various furnaces up to 1400°C		1200°C split and tubular oven with diameter up to 7cm. working in controlled atmosphere.1200°C muffle. 1400°C muffle.850°C air recirculating chamber furnace.1000°C controlled atmosphere chamber connected to the glove box.	GE	Vignolo
13	Metallographic Laboratory		Grinding, lapping and polishing machines for manual or automatic preparation of metallographic specimens; mounting press for the embedding of the sample into resin for metallographic specimens; cut-off machines including two precision table top cut-off machines for delicate precision cutting and one cut-off machine for more larger object, all equipped with a large selection of cut-off wheels covering virtually all materials.The laboratory includes the entire range of equipment and consumables for metallographic and ceramic specimen preparation.	GE	Bernini

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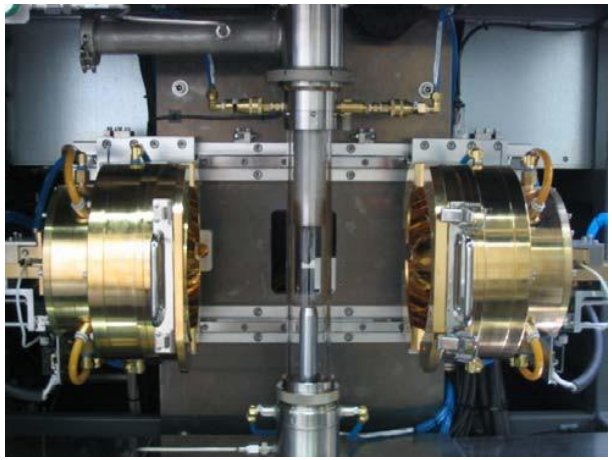
14	Infrared image furnace		The main equipment related to the single crystal growth activity is the infrared image furnace installed in 2005. This was the first time an instrument of this kind was used in Italy. It is a two mirror system, where the light from the two halogen bulbs is focused by the semi-ellipsoidal mirrors onto a central zone. The efforts of the SPIN researchers involved in the field of single crystal growth are focused on the growth of large superconducting and magnetic oxides. Single crystals of high Tc superconducting oxides, pure and eutectic strontium ruthenates and multiferroics are regularly produced and made available to collaborators within the Italy and abroad.	SA	Vecchione
15	Muffle fornace		Muffle fornace: for standard heat and processing treatments at high temperatures (annealing) in air up to 1500 °CEquipment used for also with controlled thermal profiles are available (up to temperatures of 1700 °C).	SA	Vecchione

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16	Horizontal fornace		Horizontal fornace for standard heat and processing treatments at high temperatures (annealing) in oxygen, air, argon and nitrogen under controlled thermal profile up to 1700 °C	SA	Vecchione
17	3-zones horizontal furnace		Horizontal furnace with alumina tube chamber (diameter: 5 cm) with 3 systems with 3 resistances with independent temperature regulation (controller Eurotherm). The central zone ranges about 10 cm; the 3 zones allow to obtain temperature gradients up to 10°C/cm. The furnace is mainly used to carry out annealing under different atmospheres (oxygen, air, argin nitrogen) up to 1500°C; it can be used also to grow bulk material under a thermal gradient.	SA	Gombos
18	Lapping machine		Lapping and polishing machines available at SPIN laboratory allow to smooth and polish the surface of many solid material to sub-micrometer roughness.	SA	Vecchione
19	Synthesis of single-crystals by wet chemistry and by means of solid state reactions		Furnace with forced convection for the synthesis in water solutions up to 300°C. The laboratory is also equipped with scales, presses, mortars for sintering oxide greens, as well as PLD targets. A water de-ionization system (Fischer) is also available.	RM	Medaglia

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20	Furnaces for oxide synthesis and thermal treatments		The laboratory is equipped with a furnace working up to 1400°C and further two tubular horizontal furnaces, the former with an alumina tube (up to 1200°C), the latter with a quartz tube (up to 1000°C). In this latter furnace it is possible to carry out heating treatment under a controlled atmosphere.	RM	Tebano
21	Isostatic Press	Built on special design 	Isostatic Press for the preparation of powder greens with different morphologies. Maximum pressure: 1000 bar; chamber diameter 10 cm. The powders to be sintered are put inside a rubber mould, that is inserted within the oil contained in the chamber. By applying a pressure in the chamber it is possible to obtain powder compacts (green) with minimum porosity.	GE	Martinelli
22	Induction Furnace		Induction furnace for the preparation of metallic samples. By means of this furnace it is possible to heat, up to their melting, metallic samples under a controlled atmosphere (vacuum or inert gas). Maximum power: 30 kW.	GE	Martinelli

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23	Hazardous material lab	 	The lab is equipped for safe working of toxic material in form of powder or liquid. A forced aeration system is installed in order to have an adequate air change. The lab is equipped with a sink and a classical chemical hood for usual product manipulation. An aspirated table with fluid collection and a special hood for a furnace was specifically designed and realized by a specialized factory. The lab was also equipped with: • Technical gases lines • Electrochemical cells (standard and for flat samples) • PC controlled, high current Potenziostat • Ph-meter • Precision balance • Stirrer and heating plate • Three zone tubular furnace (Pure O2) up 1200°C • Single zone tubular furnace (controlled atmosphere or high vacuum) up 1200°C • Muffle furnace • Glass dryer • Oscilloscope • PC and tablet for electronic lab journal • Chemical glassware • Materials for sample and toxic waste storage.	GE	Bellingeri