

Policy document for National Spark Plasma Sintering (SPS) Facility

About SPS

The National Spark Plasma Sintering (SPS) facility has been established at Department of Materials and Environmental Chemistry at Stockholm University 2013. The facility has two SPS machines SPS-825 and SPS-530ET(integrated with glove-box). The SPS machines were supported by infrastructure-grant for expensive scientific instruments from Vetenskapsrådet (VR). The SPS facility is capable to subject the materials to rapid sintering cycles in vacuum or inert atmosphere. The materials include but are not restricted to ceramics, metals and alloys, intermetallics, composites and porous materials. The SPS facility can produce sintered materials of both small and large dimensions and handle air-sensitive materials.

Model SPS-825

SPS 825 is suitable for medium and large size samples in vacuum and inert atmosphere. The integrated pressing unit provide a pressing force that covers the range from 2-250 kN. SPS 825 can heat dies containing powder materials at a heating rate from 1 °C to 1000 °C per minute and up to 2500 °C. SPS 825 is equipped with ultra-high vacuum system as well which allow users to run their samples under high vacuum range.

SPS-530ET

SPS 530ET is suitable for small and medium size samples in vacuum and inert atmosphere. The integrated pressing unit provides a pressing force that covers the range from 1-50 kN. SPS 530ET can heat dies containing powder materials at a heating rate from 1 °C to 1000 °C per minute and up to 2500 °C. SPS 530ET is integrated with a glove-box in argon atmosphere, suitable to prepare, prepack and prepress air and water sensitive materials. SPS 530ET is equipped with ultra-high vacuum system which allow users to run their samples under high vacuum range.

Access

New users, who want to use the SPS machines, should contact one of the following persons: Dr. Mirva Eriksson, Prof. Gunnar Svensson, contact information at the end of the document.

There are Three levels of access to the instruments;

- 1) Short term studies with operator from MMK-SU
- 2) Short term studies without operator from MMK-SU
- 3) Long term studies with/without operator from MMK-SU

The operator is normally SPS manager. The short-term studies are intended for researchers who need help for few samples and do not have the competence within their group to perform the sintering. It also includes so called test runs to check if this sintering technique is feasible for their research work. Short-term studies encompass up to 2-10 samples. If the user is satisfied with the results, they can contact SPS manager for further experiments, either for long term studies with operator (Operator time will be charged per hour.) and/or without operator.

For short and long term studies, without an operator, one should get a license on the tool. First, a training session will be arranged in a group/individually. Usually the session is about 4 to 6 hours (Training session will be charged, see table 2). Newly trained users have to perform at least once in front of SPS manager that they can operate the machine without any problem. When the user passes, the person will be provided with the license and the user name for the booking system.

Booking system

Our aim is to maintain SPS machines in an effective way and that they should be easy to access by all the researchers both from groups inside Stockholm University as well as from other universities or academic institutes, industry and companies (external users). For this reason, one has to use the booking system efficiently to plan your experiments. Details of the booking system (LIMS) will be informed when one will receive their license.

The laboratory regulation and safety instructions should be followed. In case of misuse, the user's license may be canceled for a specific time of period.

Price List

There are Different types of user with different price setting. Details of the pricing are in the Table 1.

- Internal users (from MMK), no operator fee will be charged.

- External academic users, operator fee will be charged if operator is required.
- Industry users, operator fee will be charged if operator is required.

Table 1: Instrument fees in SEK/hour

Instrument	MMK User (SEK)	External Academic User (SEK)*	Commerical User (SEK)*
SPS-825	800/h	1200/h	2250/h
SPS-530ET	800/h	1200/h	2250/h
Daily fee**		7000	15 000
Operator fee		1000/h	1500/h
Training fee	2000	2000	1500/h

*Minimum 2 hours booking for each session

**Applies for booking of one instrument for one day (9-17), operator fee will be added if required

The prices include all the services except the die price, for details see the next section. Additional fee will be charged for the training sessions, for internal and external; one training session will be 2000 SEK. For industry users the training will be charged 1500 SEK/hour.

SPS Dies price List

We order large number of dies in advance which can facilitate your experiments without any delay time, which you can buy, see prices in table 2. But you are most welcome to order your own dies. For the material, quality and company details you can contact SPS manager.

The facility has available following standard sizes with inner diameter of: d10, d15, d20, d50 mm. There are other sizes as well, contact the manager if you have some specific size in mind.

The standard die sizes are included into the projects with operator. In case of not-standard die which is broken during the experiments some cost will be charged from the user. The

charge will depend on the die size and design. If special dies are to be ordered the cost will be added to the price.

Table 2: Die prices for standard sizes in SEK. A pair of punches is included.

	SEK
Die 8 mm-set	400
Die 10 mm-set	500
Die 12 mm-set	700
Die 15 mm-set	1000
Die 20 mm-set	1670
Extra pair of punches < d15	300
SPS Machine Training (academic user)	2000
SPS Machine Training (industry)	1500/h

How To Pay

MMK administration will send the bills to your department/institute/industrial parties. If you would request for the detail history of your machine use, it can be provided by the SPS manager. The users have to provide their billing information to the SPS manager as soon as the project is agreed.

- Short-term studies will be debited according to an agreement or every third month.
- Long-term studies with/without operator will be debited every third month.
- The bills to the industry will be debited at the end of the month when the study is completed or latest every third month.

Contact Details

For information and further details, please contact;

- **Dr. Mirva Eriksson (SPS Manager);** mirva.eriksson@mmk.su.se, Tel: 0721474405
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