

Processing Selenium in the laboratory

Milling of Selenium with FRITSCH Planetary Mills

Selenium – listed in the periodic system of the elements in the 6th main group, below sulphur, is unknown to many. Although it belongs to the essential trace elements and is integrated by the body in the so called 21st amino acid. But still, it's a toxin and the comminution of it requires a certain caution.

The following interesting statements are found at: wikipedia^[1]

- Several modifications exist
- Selenium is considered a semi-metal
- Above 60° C a glass like modification occurs
- The forming above 80° C grey, semi-metal modification is the most stable form
- Selenium occurs in nature as a native metal
- Melting point 221° C
- Mohs hardness 2

The Task

The task was to process – metallic in appearance - pure selenium. The provided sample was ultra-pure selenium. In order to comminute this sample, the **Planetary Mono Mill PULVERISETTE 6 classic line** was equipped with the 250 ml zirconium oxide grinding bowl and 15 x 20 mm grinding balls were chosen. Although we recommend in our technical documents a maximum feed size of 10 mm, the chunks shown in the photo are clearly larger though. For the pre-comminution no technology was available which excluded a contamination. Therefore the sample was added as shown.



Fig. 1: Base sample of selenium

Results after 5 minutes comminution

After a processing time of 5 minutes at a maximum rotational speed (650 rpm), it was assessed and exactly as expected, a fine powder with several, few rough chunks was found. On the photo those are seen next to the coin (comparison of size) and on the lower rim of the photo. These chunks were sorted out and the remaining sample was ground further.



Fig. 2: Comminuted selenium

Grinding results

After a total of 11 minutes, a fineness was obtained, which allowed the weighted sample of a representative sample amount of 1 g.



Fig. 3: Comminuted selenium

Sources and literature

^[1] wikipedia

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