铌酸锂

行　　业：	Chemistry
进料尺寸：	< 10 µm
最终精度：	d50 < 100 nm
样 品 量：	3 g
研磨建议：	For finest grinding results, we recommend using Planetary Micro Mill PULVERISETTE 7 premium line.

PLANETARY MICRO MILL PULVERISETTE 7 PREMIUM LINE

main disk speed: 1100 rpm

45 ml grinding bowl made of zirconium oxide (ZrO2)

+ 70 g of grinding balls with 0,5 mm Ø made of zirconium oxide

Feed quantity:	3 g of Yb Li-niobat
Feed Size:	< 10 µm (majoritly << 5 µm)
Additive:	+ ~ 6 ml water
Grinding time:	1 hour
Final fineness:	d50 < 70 nm
Comments:	By optical microscopy, we found a lot of particles smaller than 5 µm, plus a few with a maximum length of ~ 10 µm. For such a start size, we recommend using 0,5 mm grinding balls. With some kind of samples, even the smallest possible grinding balls of 0,1 mm Ø might be usable.

With ~ 3 grams of sample, we recommend using the 45 ml grinding bowl (just in case more of water will be required to dilute sample for a motor oil like viscosity).

In the beginning of grinding process, we added about 6 ml of water to moisten all particles and grinding balls properly.

To avoid over pressure, we ground the sample in steps of 3 minutes, followed by a programmed pausing time of 10 minutes. After several cycles, the outside temperature of the bowl should be checked (remain below 80 °C); grinding time or programmed pausing time might be readjusted afterwards. This is counting for all further grinding trials too.

We took a small sample after 15 minutes for demonstration and proceeded comminution until one hour of grinding has been reached. After a total of 60 minutes, the particle size distribution was checked. We already found a d50 < 70 nm.

Even longer grinding times are plausible as well as a further change to 0,1 mm Ø grinding balls for improvement of result.

Returned samples might be flocculated during transportation, we recommend a previous treatment with strong ultrasonic force before using (for several minutes).

Nanometer fine sample might also flocculate in suspensions during grinding; in such cases, it will be beneficial to add grinding agents into the slurry. This can be acids, bases when water will be used, also a huge amount of surfactants can be used for stabilization.

PLANETARY MICRO MILL PULVERISETTE 7 PREMIUM LINE

main disk speed: 1100 rpm

45 ml grinding bowl made of zirconium oxide (ZrO2)

+ 70 g of grinding balls with 0,5 mm Ø made of zirconium oxide

Feed quantity:	~ 3,7 g of Er Li-niobat
Feed Size:	< 10 µm
Additive:	+ 9 ml IPA
Grinding time:	1 hour
Final fineness:	not determined
Comments:	Second sample got comminuted analogue result 1. In this test, we used isopropyl alcohol instead of water.

Settings have been equal to result 1; we picked a small sample after a total of 30 minutes of grinding for demonstration.

After one hour of grinding, the sample got packed best possible as well. One main difference has been observed during this trial. The sample which was ground with the same kind of setting and equipment got discolored lightly. After grinding we found not a white coloration anymore. The sample has shown a blue-gray discoloration. This has been observed several time for other white mineral samples as well.

We tried to check particle size distribution, but sample we prepared was flocculating inside the flask and couldn't be measured this way. We expect an almost equal result to trial 1. Eventually, without surface tension, sample might be ground even finer with alcohols.