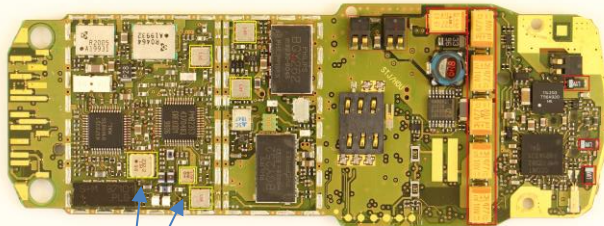


16 – RECOVERY OF TANTALUM AND TUNGSTEN



IDENTIFIED VALUABLE ELECTRONIC COMPONENTS FOR H.C. STARCK TANTALUM AND NIOBIUM GMBH

Example: PCB from NOKIA 3210



SAW filters

Ta capacitors

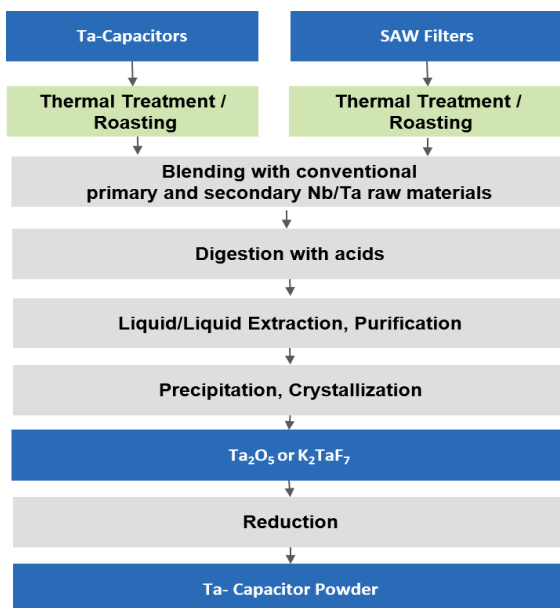


vibration alert

valuable electronic components in mobile phones, which are of interest for recycling process are:

- tantalum - Ta
tantalum capacitors
SAW filters
- tungsten - W
imbalance mass from vibration alerts

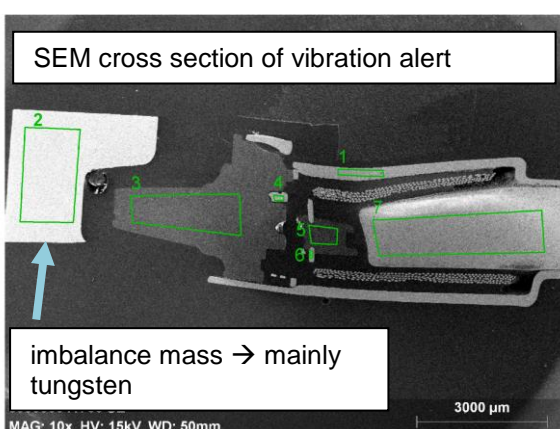
RECOVERY OF TANTALUM FROM CAPACITORS AND SAW FILTERS



Tantalum from fractions of desoldered Ta capacitors as well as SAW filters can be recovered according to the flow chart.

- First step is a calcination at >1000 °C to oxidize all remaining metal and plastic parts, followed by a digestion in acid.
- As still significant amounts of impurities are in solution, an additional liquid/liquid extraction step for removal of all impurities is essential.
- After purification, the further manufacturing of Ta capacitor powders follows the established state-of-the-art processes, i.e. crystallization and reduction.

RECOVERY OF TUNGSTEN FROM VIBRATION ALERTS



- Main applications of tungsten in mobile phones are vibration alerts, in particular the imbalance masses thereof.
- The most important step is a separation of the imbalance mass from the motor unit:
Option 1) calcination of complete devices followed by a digestion of tungsten with a suitable acid solution.
Option 2) mechanical treatment (i.e. milling) of alerts followed by the separation of imbalance masses by sieving and digestion of tungsten
- After the digestion process, the further purification and processing follows in accordance to existing production processes for tungsten products.

SEM scanning electron microscopy