

MAEDA LAB.

[Recycling process of metal scraps]

Integrated Research Center for Sustainable Energy and Materials

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Materials Process Engineering

Department
of Materials
Engineering

Passivation of copper anode with a high impurity concentration

Recycling of copper from waste electro devices

In the copper refining process, electrorefining process is applied for purification of crude copper (grade:99%). However, the grade of crude copper obtained from copper scraps is low (~90%). Electrorefining cannot be applied to such low grade copper because impurities in copper anode inhibits the dissolution (passivation). Hence, we investigate the electrorefining process with low grade copper.

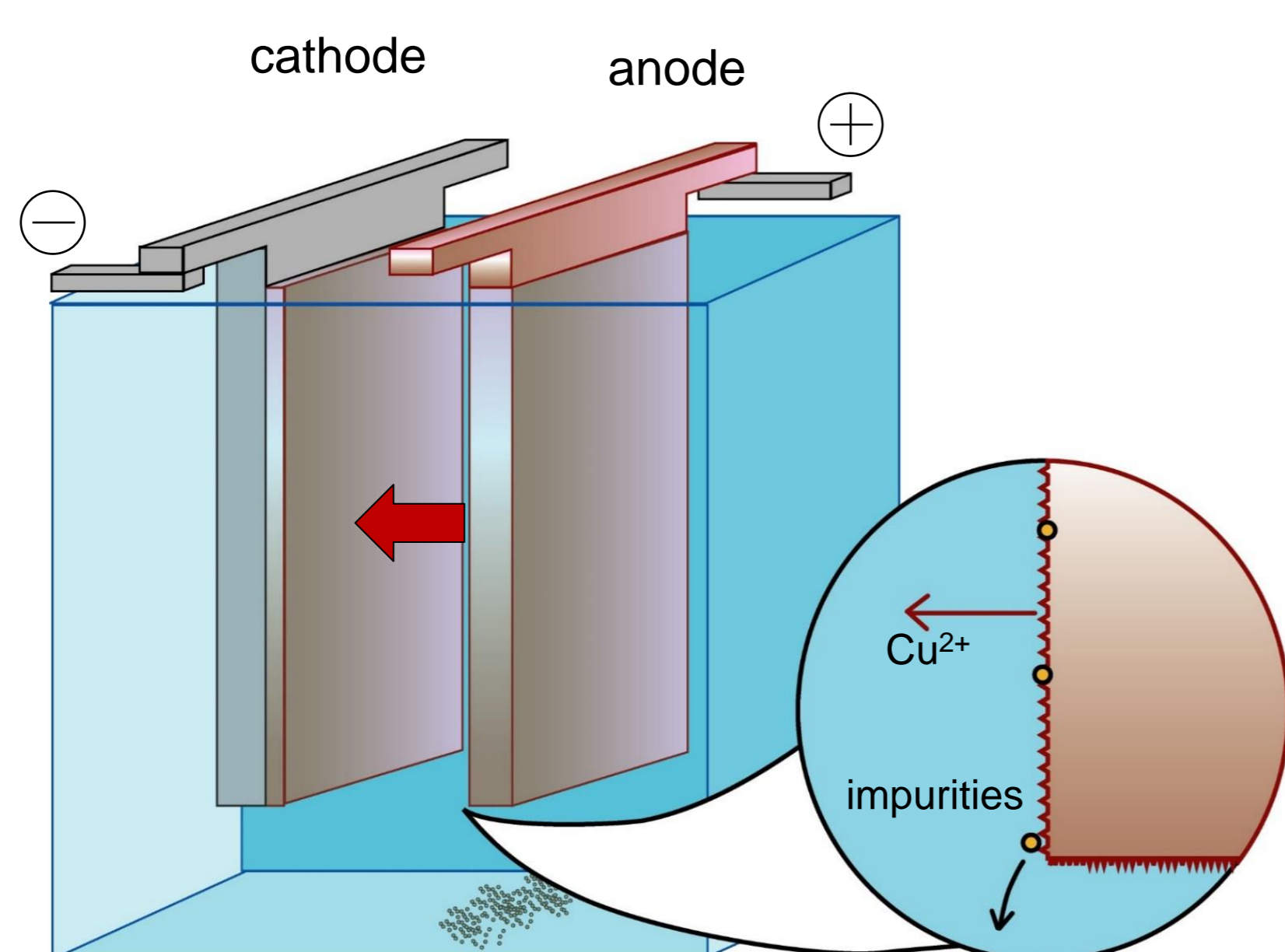


Figure Schematic view of electrorefining
Impurities which do not dissolve into electrolyte hinders dissolution of copper.

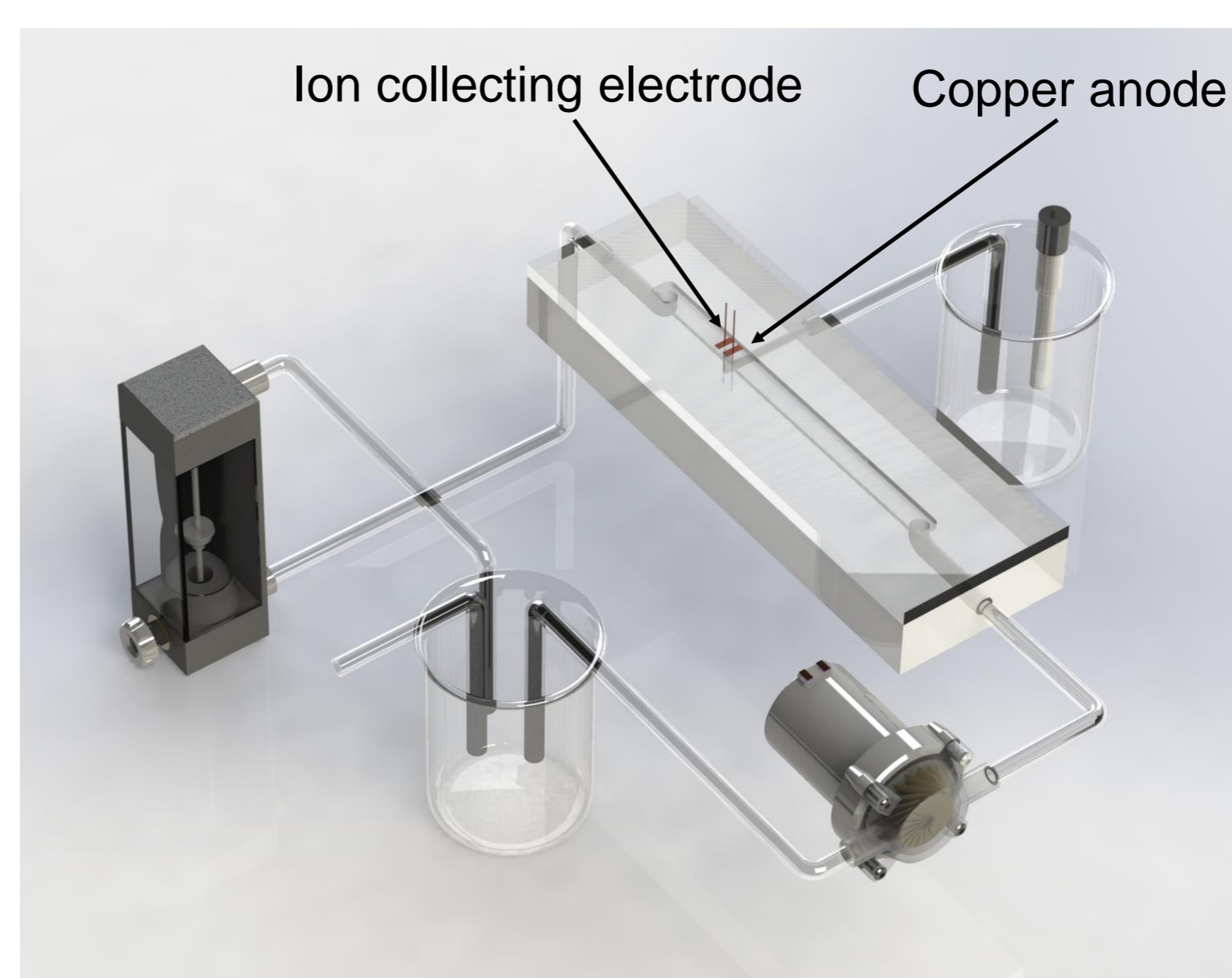


Figure Electrolytic experiment instrument
Copper based alloy is anodically dissolved into electrolyte and dissolving ions are detected.

Precipitation mechanism of spheroidal graphite in cast iron

Advanced recycling process of ferrous scraps

Generally, cast iron is a ferrous alloy with carbon and silicon as the main alloying elements. Owing to high concentration of carbon in cast iron, carbon precipitates as graphite with different morphologies. In our research group, we study the structure control of ductile iron; a type of cast iron which graphite takes on nodular/spheroidal shape. Effects of impurities originating from ferrous scraps in recycling process and formation mechanism of spheroidal graphite are investigated.

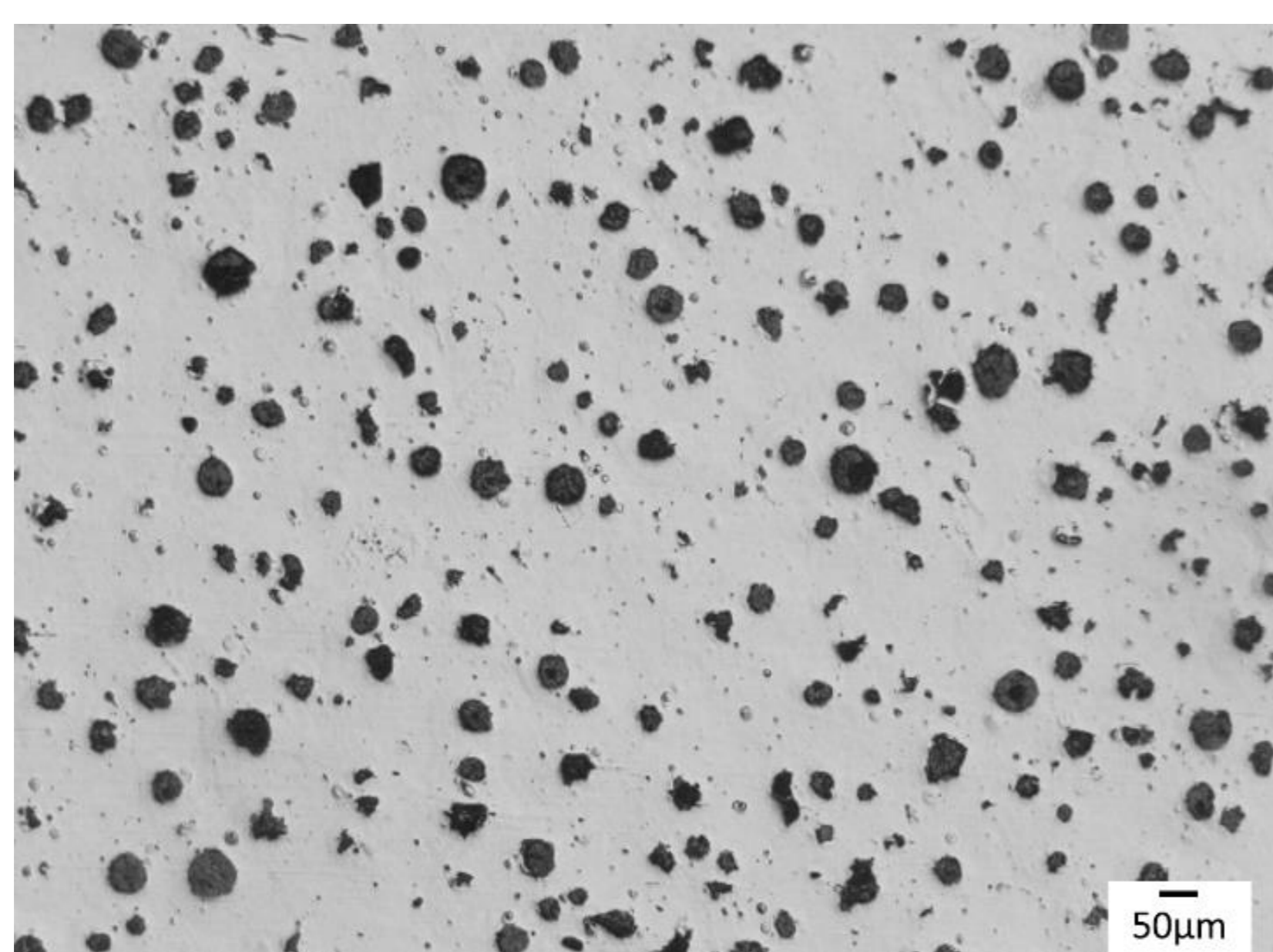


Figure Cross sectional image of ductile iron

Extraction of
graphite

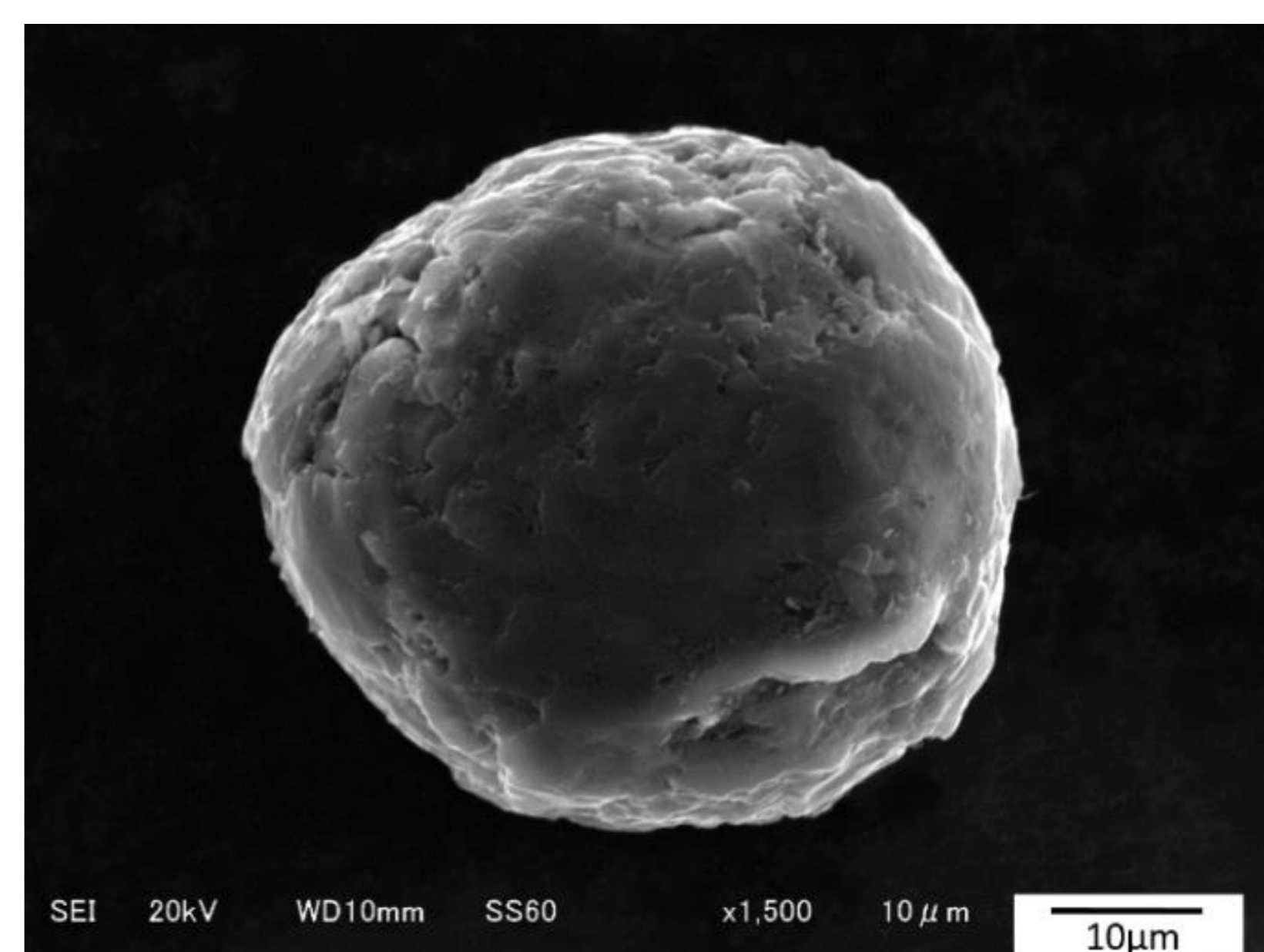
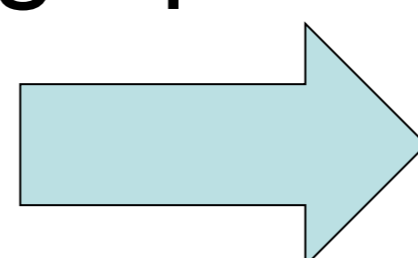


Figure Spheroidal graphite