CLAIMS

1. An imaging system, comprising: a micro computed tomography (micro-CT) subsystem, a specimen processing subsystem, a scanning electron microscopy (SEM) and a processor, wherein

the micro-CT subsystem comprises an X-ray source and an X-ray detector, and is configured to acquire a three-dimensional image of a specimen;

the specimen processing subsystem comprises: a focused ion beam subsystem and a mechanical cutting device, wherein the focused ion beam subsystem is configured to process the specimen in a first processing manner, and the mechanical cutting device is configured to process the specimen in a second processing manner, to obtain a target section of a target area;

the SEM is located above the specimen and is configured to acquire a two-dimensional image of the target section; and

the processor is configured to perform three-dimensional reconstruction on the two-dimensional images to obtain a three-dimensional imaging of the specimen.

2. The imaging system according to claim 1, wherein the processor is further configured to determine a first area of the three-dimensional image and location information of the first area;

at least one of the focused ion beam subsystem or the mechanical cutting device is further configured to process an area in the specimen other than the first area to make the first area exposed or to be exposed;

the micro-CT subsystem is further configured to acquire a three-dimensional image of the processed specimen; and

the processor is further configured to perform navigation correction on the first area based on the three-dimensional image of the processed specimen to obtain a second area, and determine location information of the second area to be location information of the target area, wherein the location information of the target area is used by the specimen processing subsystem to process the specimen.

3. The imaging system according to claim 1 or 2, wherein the specimen is arranged

on a specimen stage capable of moving in five degrees of freedom.

4. The imaging system according to claim 1 or 2, wherein an angle between an axis of the focused ion beam subsystem and a vertical direction of the specimen is θ, where θ is larger than or equal to 0, and smaller than or equal to 180 degrees.

5. The imaging system according to claim 1 or 2, wherein the mechanical cutting device is: a glass cutter, a stainless steel knife, a diamond cutter or a microtome.

6. The imaging system according to claim 1 or 2, wherein the SEM further comprises an energy dispersive spectrometer (EDS) configured to acquire an energy spectrum of the specimen.

7. The imaging system according to claim 1 or 2, wherein the X-ray source, the X-ray detector and the specimen are arranged on a same line, the X-ray source and the X-ray detector are arranged on opposite sides of the specimen.

8. A method for specimen detection, applied to an imaging system, wherein the imaging system comprises: a micro computed tomography (micro-CT) subsystem, a scanning electron microscopy (SEM), a processor, and a specimen processing subsystem comprising a focused ion beam subsystem and a mechanical cutting device; the method comprises:

acquiring, by the micro-CT subsystem, a three-dimensional image of a specimen;

acquiring, by the processor, location information of a target area based on the three-dimensional image;

processing, by at least one of the focused ion beam subsystem or the mechanical cutting device, the specimen based on the location information for multiple times, to expose a target section of the target area;

acquiring, by the SEM, two-dimensional images of a plurality of target sections resulted from the multiple times of processing; and

performing, by the processor, three-dimensional reconstruction on the obtained two-dimensional images to obtain a three-dimensional image of the target area.

9. The method according to claim 8, wherein processing, by at least one of the focused ion beam subsystem or the mechanical cutting device, the specimen based on the location information for multiple times, and acquiring, by the SEM, two-dimensional images of a plurality of target sections resulted from the multiple times of processing comprises:

~~performing, by the focused ion beam subsystem or the mechanical cutting device, tomography cutting on the target area of the specimen to obtain a first target section, acquiring, by the SEM, a first two-dimensional image of the first target section;~~

performing, by the focused ion beam subsystem or the mechanical cutting device, tomography cutting on the target area of the specimen to obtain each of the plurality of target sections~~a second target section~~; acquiring, by the SEM, a respective ~~second~~ two-dimensional image of the each of the plurality of target sections~~second target section~~;

~~and so on,~~ until imaging of the target area of the specimen is completed to acquire the two-dimensional images of the plurality of target sections of the specimen.

10. The method according to claim 8 or 9, wherein acquiring, by the processor, location information of the target area based on the three-dimensional image comprises:

determining a first area of the three-dimensional image and location information of the first area;

processing, by at least one of the focused ion beam subsystem or the mechanical cutting device, an area in the specimen other than the first area to make the first area exposed or to be exposed;

acquiring, by the micro-CT subsystem, a three-dimensional image of the processed specimen;

performing navigation correction on the first area based on the three-dimensional image of the processed specimen to obtain a second area; and

determining location information of the second area to be location information of the target area.

11. The method according to claim 8 or 9, wherein an angle between an axis of the focused ion beam subsystem and a vertical direction of the specimen is θ, where θ is larger than or equal to 0, and smaller than or equal to 180 degrees.

12. The method according to claim 8 or 9, wherein the micro-CT subsystem comprises: an X-ray source and an X-ray detector, wherein the X-ray source, the X-ray detector and the specimen are arranged on a same line, and the X-ray source and the X-ray detector are arranged on opposite sides of the specimen.