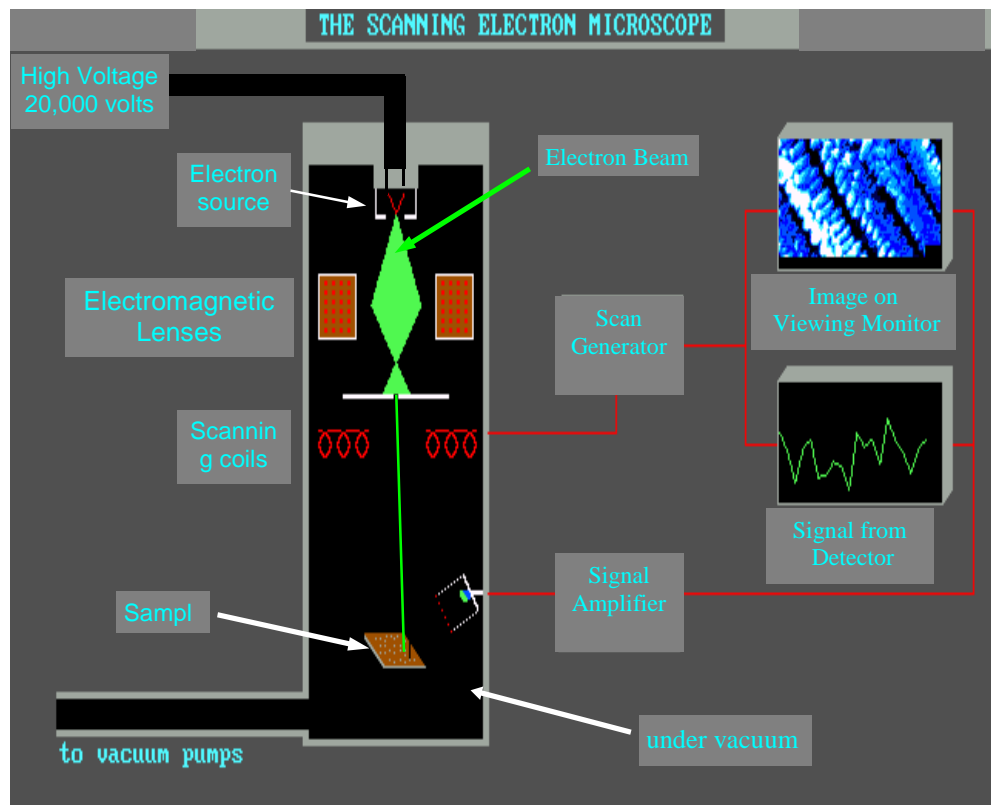


MICROSCOPE IMAGES IN YOUR WORLD



How does a Scanning Electron Microscope work ?

Connecting a piece of tungsten wire to a power source and placing it in a vacuum, to stop oxidation of the wire, will produce light, heat and a radiation of electrons.

By connecting a very high voltage to the wire, the liberated electrons will have a charge of that high voltage. The wire is then mounted in a specially designed housing to focus the electrons in a particular direction. This is now a beam of electrons that make up the source for the electron microscope.

By passing the electrons through an electromagnetic field, their path can be controlled and altered.

Using a series of three electromagnetic lenses a focused beam of electrons can now be focused onto the sample in the microscope sample chamber area.

A small set of electromagnetic coils are placed near the bottom of the column of electrons, to push and pull the beam from left to right, top to bottom across the sample surface.

As the electrons from the beam collide with the atoms in the sample, secondary electrons are given off and collected by the secondary electron detector. Depending on the topography of the particular point of impact, a certain number of secondary electrons will be emitted. The signal from the SE detector is used to control the contrast on a viewing monitor.

The same electronic circuitry that scans the beam, also scans the viewing monitor. By reducing the size of the area scanned by the beam across the sample and keeping the viewing monitor size the same, the data from the sample is magnified on the viewing monitor.

In this way the S.E.M. is used to scan a beam of electrons across the surface of a sample to magnify an area of interest.



This information is brought to you by the Microscopy Society of Southern Africa in the interest of furthering research, awareness and development of microscopy in the region.

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