Q1) What is meant by electron diffraction?

Electron diffraction is **the phenomenon resulting from the interaction between electrons and crystalline materials, producing a pattern of rings or spots that characterize the sample**

Q2) Why is electron diffraction pattern circular? Hint: Graphite used

[](https://www.google.com/search?q=Why+is+electron+diffraction+pattern+circular?&tbm=isch&source=iu&ictx=1&vet=1&fir=AlYOMCW7BwMv3M%252C69xQ0SECEDOLPM%252C_&usg=AI4_-kS_j7A4lzlr1t4kvgq7Vy8W04D-sA&sa=X&ved=2ahUKEwiUlI6o0YL4AhVsiv0HHcweBhoQ9QF6BAgNEAE" \l "imgrc=AlYOMCW7BwMv3M)

The diffraction pattern observed on the screen is a series of concentric rings. This is due to the regular spacing of the carbon atoms in different layers in the graphite. However **since the graphite layers overlay each other in an irregular way** the resulting diffraction pattern is circular.

Q3) Why are crystals used for electron diffraction?

**Crystals contain periodic structural elements serving as a diffraction grating that scatters the electrons in a predictable way**. The diffraction pattern of an electron beam passing through a layer of a crystalline material contains information about the crystal structure.

Q4) Why is electron diffraction better than XRD?

1. **The wavelength of electrons (e.g., 1.97 pm for 300 keV electrons) is much shorter than that of X-rays** (about 100 pm). Therefore, the radius of the Ewald sphere is much larger and more reflections are observed by ED than by XRD.

The advantages of electron diffraction are that **electrons are much less penetrating and scatter much more intensely than X-ray**. As a result, electrons are sensitive, even on a very thin layer sample, thus giving a strong diffraction pattern in a short time.

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What does resistivity of a metal depend on?

What is resistivity short answer?

resistivity, **electrical resistance of a conductor of unit cross-sectional area and unit length**. A characteristic property of each material, resistivity is useful in comparing various materials on the basis of their ability to conduct electric currents.

The resistivity of a material depends on **its temperature**. Most metals have lower resistance as the temperature drops. Some materials become superconductors when they fall below a critical temperature. They offer zero resistance to the flow of current.

how can we explain the difference between the resistivity and the resistance of the conductor?

Expert Answer:

The resistance of a conductor is the ratio of potential difference across its ends to the srength of current flowing through it.

Resistance means the obstruction to the flow of electrons through it.

Resistivity is defined as the resistance offered by a cube of the material of side 1 m when the current flows perpendicular to the opposite faces of the cube. it depends on the nature of the amterial of the conductor.

If the length of wire is halved and its cross-sectional area is doubled, then what would be the resistance of the wire? (Given, initially the resistance of the wire is R

Expert Answer:



State two factors which does not affect the resistivityof a conductor?

Asked by bharadwajlucky26 | 14th Sep, 2018,  04:34: PM

Expert Answer:

Resistivity is different for different materials.

It does not depend on shape and size of conductor.

Draw the graph of resistivity vs temperature for a metal and a semiconductor.

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Hall Effect is a process in which a transverse electric field is developed in a solid material when the material carrying an electric current is placed in a magnetic field that is perpendicular to the current.

the production of a potential difference across an electrical conductor when a magnetic field is applied in a direction perpendicular to that of the flow of current.

What is the purpose of Hall effect experiment?

Aim: **To determine the Hall voltage developed across the sample material**. To calculate the Hall coefficient and the carrier concentration of the sample material.

What is the importance of Hall effect?

Importance of Hall effect

The Hall effect is then **used to confirm which type of material one is dealing with**. Furthermore, by measuring the Hall potential, the current, the magnetic field, and the sample geometry, it is easy to calculate the number of charge carriers per unit volume in the material tested.

Why is Hall effect more effective in semiconductors?

The importance of the Hall effect becomes apparent when semiconductors are used, as we now see. In semiconductors, the charge carriers which produce a current when they move may be positively or negatively charged. The Hall effect **helps us to find the sign of the charge carried**

What is difference between dielectric and insulator?

So, What is the difference between dielectric and insulator? **Insulators are materials that do not conduct electricity in an electric field, since they do not have free electrons.** **On the other hand, dielectrics are insulators that can be polarized**.

What factors affect dielectric constant?

The dielectric constant depends upon a variety of factors, such as **temperature, moisture content and frequency**; all these factors should be kept constant and recorded when the dielectric constant is being measured.

What is dielectric constant in simple words?

Dielectric constant (ϵr) is defined as **the ratio of the electric permeability of the material to the electric permeability of free space** (i.e., vacuum) and its value can derived from a simplified capacitor model.

What is 2 theta value in XRD?

[](https://www.google.com/search?q=What+is+2+theta+value+in+XRD?&tbm=isch&source=iu&ictx=1&vet=1&fir=pUS3bwKSFhsHoM%252C7AZxDmDoYpKecM%252C_&usg=AI4_-kT4AcqKReK6lSz0VIqQ5OPLIeoBhw&sa=X&ved=2ahUKEwibhpKw5oL4AhUSiP0HHWciBZYQ9QF6BAgIEAE" \l "imgrc=pUS3bwKSFhsHoM)

It is also equal to the angle between reflected beam and the crystallographic plane. 2 θ is **the angle between transmitted beam and reflected beam**. In any experiment the transmitted and reflected beam can be observed, so 2 θ is an experimentally measurable quantity.

What is a diffraction peak?

**The position of the diffraction peaks are determined by the distance between parallel planes of atoms**. • Bragg's law calculates the angle where constructive interference. from X-rays scattered by parallel planes of atoms will produce a diffraction peak. – In most diffractometers, the X-ray wavelength λ is fixed.

Why is Xray Diffraction important?

X-ray diffraction is a powerful nondestructive technique for characterizing crystalline materials. It **provides information on structures, phases, preferred crystal orientations (texture), and other structural parameters, such as average grain size, crystallinity, strain, and crystal defects**.

What is powder method?

[](https://www.google.com/search?q=What+is+powder+method?&tbm=isch&source=iu&ictx=1&vet=1&fir=iBzp4tPUArmxkM%252CG5wkfAlojJe7HM%252C_&usg=AI4_-kTZeBzqyNmovPBhZMMBg6GwYlQNRg&sa=X&ved=2ahUKEwiG5dTH54L4AhUGDuwKHRsTD-4Q9QF6BAgIEAE" \l "imgrc=iBzp4tPUArmxkM)

The powder method is **used to determine the value of the lattice parameters accurately**. Lattice parameters are the magnitudes of the unit vectors a, b and c which define the unit cell for the crystal. If a monochromatic x-ray beam is directed at a single crystal, then only one or two diffracted beams may result.

What is difference between XRD and Pxrd?

Crystals considered to be a powder when studied by XRD behave as single crystals in ED. While **PXRD provides only one-dimensional information where diffraction peaks with similar d values overlap, ED provides three-dimensional information with no peak overlap**.

Why do we observe peaks of different heights in the XRD pattern?

EACH DIFFRACTION PEAK SHOW A PLANE IN LATTICE OF THAT MATERIAL. **HEIGHTS OF A PLANE SHOW HOW MUCH X-RAY GET DIFFRACTED FROM A PARTICULAR LATTICE PLANE AND THAT SHOW DOMINANCE OF THAT PLANE IN THAT MATERIAL**.

What is absorption semiconductor?

Absorption in semiconductors occurs, of course, **when an electron absorbs a photon**. Often the electron is excited into the conduction band, leaving a hole in the valence band1

What is energy gap and it importance?

Solution. **The gap between the bottom of the conduction band and the top of the valence band** is called the energy gap or the bandgap. This bandgap is present only in semiconductors and insulators. The magnitude of the bandgap plays a very important role in the electronic properties of a solid