INTERNATIONAL YEAR OF CRYSTALLOGRAPHY



History and The activities of crystallography in Egypt during the IYCr2014

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History of Crystallography in Egypt

- **Crystallography in Egypt started 1952**
- In 1978 Egypt Joined The International Union (IUCr)
- In 1995 the Egyptian society of crystallography and application (ESCA) started, it is a member of (ECA) now
- (ESCA) tried to introduce crystallography to scientists working in other fields(chemistry, Biology, Dentistry...ect)
- (ESCA)tried to convince the industrial sector about the great role that crystallography can play in improving the quality of their products and in suggesting models for producing new products with better qualities. These activities were achieved by visiting and giving lectures at different research centers , universities and industries
- Now a day We have crystallographers who are specialized in all fields of crystallography.

The Activities of Crystallography in Egypt During The IYCr2014

- We were able to arrange 4 activities in IYCr2014:
- 1- Symposium for two days (12-13) March at El-Minia University about (XRD and Structural Characterization of Materials).
- 2- A training Course for the Secondary School Teachers about (how to Crystallize Crystals). It was held for two days (9-10) September at the National Research Center.
- 3-A Symposium about (Structural Role of Crystallography in Pharmacological Sciences)for one day at the National Research Center (24) September).
- 4-A workshop for three days (15-18) November at Hergada about (Synchrotron Radiation in Nanomaterials Research).

The Topics of XRD and Structural Characterization of Materials

- Application of XRD Analysis in Medicinal Materials
- Synchrotron Radiation and SESAME Project
- X -ray Powder Diffraction Using Synchrotron Light: Basic Concepts
- Ab -initio Structure Determination from Powder Diffraction
- Application of XRD in Solving Some Archeological Problems
- Microstructure Characterization of Polycrystalline Materials
- Posters

The Topic of The Structural Role of Crystallography in Pharmacological Sciences

- Quality Control in Pharmaceuticals Industry
- Chemical Synthesis of Medicinal Drugs
- Disease-related Proteins: Closer Look With Crystallography Eyes
- Methods and Advantages of Computer Aided Drug Design

The topics of The Synchrotron Radiation in Nanomaterials Research

- Impact of Crystallography On Our Life In Hundred Years
- Introduction to Synchrotron Radiation and Applications.
- Synthetic Methods Of Nanomaterials: Shape & Size Control Via Chemical Methods.
- Quantitative structure determination of Nano-structured materials using PDF analysis
- Nanomagnetism in the Light of Circular Polarized X-RAY.
- Global Energy Challenge and Synchrotron Radiation .
- Application of the EXAF Spectroscopy to Structural Investigation of Nanomaterials.
- Synchrotron Radiation for Advanced Bio-imaging: Microspectroscopy and Nano-FTIR
- Microstructure determination using : PM2K [WPPM]
- Time and Spatially Resolved X-Rays Magnetic Microscopy at Maxymus.
- **Posters**

Impact of Crystallography On Our Life In Hundred Years

- The discovery of Bragg's Law, Paved the road in front of ;material Scientists , Biologists ,Chemists, pharmacists, Geologist ,Archeologistsect
- Scientists discovered that properties are very much related to structures and structure are very much related to properties. This means that there is reciprocity between the two
- Different types of crystal had been known but they were not understood until its crystal structure was discovered (Snowflakes Crystal for example)
- It helped in Solving the structure of objects that are not a perfect crystals, such as quasicrystals and liquid crystals

Quasicrystal Dscovered by Dan Shechtman (*Physical Review Letters* (1984), vol. 53, Pages 1951–1953;



The Most Important Structures Discovered During The 20th Century

- The structure of DNA by James Watson and Francis Crick in 1958 which reveals some of the mysteries of the structure of life.
- Dorothy Hodgkin discovered the structure of cholesterol iodide and published it in 1945.
- **Discovered** the structure of penicillin in 1949.
- Published vitamin B12 in 1957, it was a natural product with unknown chemical formula and 24 water molecules. It took 8 years to be solved.
- Max Perutz started to solve the structure of hemoglobin and myoglobin just after the second world war and he finish it after 15 years with only 3Å resolution.



Vitamin B12 a Natural product With 24 Molecules of water



Structure of Penicillin 1945



Structure of Hemoglobin



More information is listed Under Egypt on the IYCr2014

The web site is :

<u>http://iycr2014.org/countries/events-</u> <u>by-country/egypt/synchrotron-</u> <u>radiation-in-nanomaterials-research</u>

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