



SESAME Cultural Heritage Day

Wednesday 16 Feb 2022, 08:00 → 12:40 Europe/Berlin



10:25

Highlight 4: Past, Present, Future: Let the Synchrotron Light Shine the Path

Speaker: Amir Rozatian (Department of Physics, University of Isfahan)



بِسْمِ اللَّهِ الرَّحْمَنِ الرَّحِيمِ

Past, Present, Future: Let the Synchrotron Light Shine the Path

Amir S. H. Rozatian, Faculty of Physics, University of Isfahan,
“Member of the SESAME Users’ Committee (SUC)”

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In collaboration with:

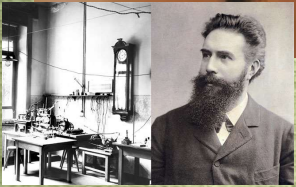
**Acknowledgments: Organizers of the Seminar,
Frank Lehner, Kirsi Lorentz, Andrea Lausi, ...
SESAME Users’ Office: Ro’a Alnatour**

**Manijeh Hadian, Farah Madani, Sahar Nouhi (RICHT),
Mohammadamin Emami (Art University of Isfahan), Somayeh Noghani (Tehran University of Art),
Ibraheem Yousef, Oriol Vallcorba (ALBA),
Marta Anghelone (University of Applied Arts Vienna), Christian Pritzel, Reinhard Trettin (University Bordeaux),
Remy Chapoulie (Université Bordeaux Montaigne), Gonca Dardeniz (Istanbul University),
Gihan Kamel, Messaoud Harfouche, Latif Ullah Khan, Mahmoud Abdellatif (SESAME)**



8 November 1895:
Discovery of X-rays

W. C. Röntgen

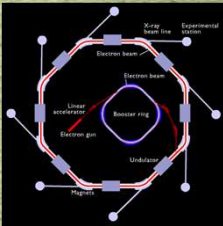


24 April 1946:
Discovery of Synchrotron Radiation, GE Lab., USA



May 1947:
Elder, F. R.; Gurewitsch, A. M.; Langmuir, R. V.; Pollock, H. C.,
"Radiation from Electrons in a Synchrotron" Physical Review, Vol. 71, Issue 11, P. 829

History of SESAME



1980s: Mohammad Abdus Salam called for a synchrotron to be built in the Middle East,

✓ "Policy makers did not pay attention"

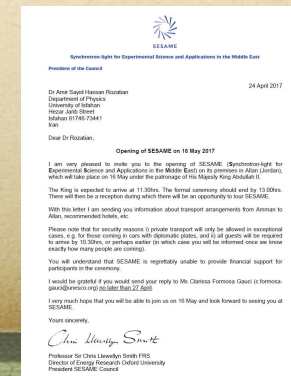


1997: H. Winick and G. Vos suggested moving BESSY-I from Berlin to the Middle East.



16 May 2017: Official Opening Ceremony

2018: First Experiments



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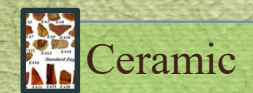
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Hadian, Emami, Vallcorba, Rozatian: A Beamtime at BL04-MSPD Beamline, ALBA, Barcelona, Spain, December 2017

“X-Ray Diffraction: well known *non-destructive* technique for Physicists and Materials Scientists”



Geomorphological Map of Qazvin Plain and Archaeological Sites



Location of Tappeh Zaghe and other Neolithic to Chalcolithic sites in Central Iran

Eur. Phys. J. Plus (2020) 135:487
<https://doi.org/10.1140/epjp/s13360-020-00486-6>

THE EUROPEAN
PHYSICAL JOURNAL PLUS

Regular Article

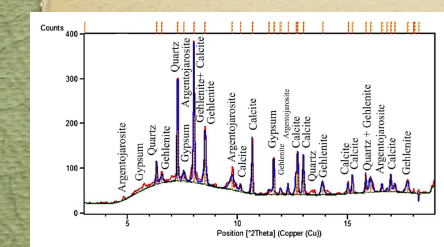


Synchrotron micro-XRD study, the way toward a deeper characterizing the early prehistoric Iranian glass cylinders from Late Bronze Age (1280 BC)

Mohammadamin Emami^{1,2,a}, Amir Sayid Hassan Rozatian³, Oriol Vallcorba⁴, Marta Anghelone⁵, Manijeh Hadian Dehkordi⁶, Christian Pritzel², Reinhard Trettn²



Fig. 1 Glass cylinders from Chogha-Zanbil: a the original cylinders for analytical purposes. b Glass pieces arrangements as they were used in Chogha-Zanbil



Eur. Phys. J. Plus (2021) 136:63
<https://doi.org/10.1140/epjp/s13360-020-01035-x>

THE EUROPEAN
PHYSICAL JOURNAL PLUS

Regular Article



Synchrotron micro-XRD applied for the characterization of pottery from the Neolithic to Chalcolithic transitional period: a case study from Tappeh Zaghe, Iran

Mohammadamin Emami^{1,2,a}, Oriol Vallcorba^{3,b}, Amir Sayid Hassan Rozatian^{4,c}, Manijeh Hadian Dehkordi^{5,d}, Hassan Talae^{6,e}, Remy Chapoulie^{2,f}

Interesting results: identification of silver-containing minerals which can be interconnected to the chemical composition as well as manufacturing process of glass in other civilizations from Egypt, Levant to Mesopotamia.





Hadian, Emami, Vallcorba, Rozatian; A Beamtime at BL04-MSPD Beamline, ALBA, Barcelona, Spain, December 2017

“X-Ray Diffraction: well known non-destructive technique for Physicists and Materials Scientists”

Surface and Interface Analysis / Accepted Articles

RESEARCH ARTICLE

Towards a deeper understanding of the 3rd millennium BC Iranian metallurgy:
Use of Synchrotron light for characterizing arsenic bearing minerals in metal
objects from Espidej



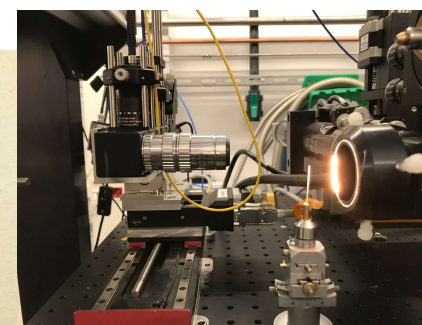
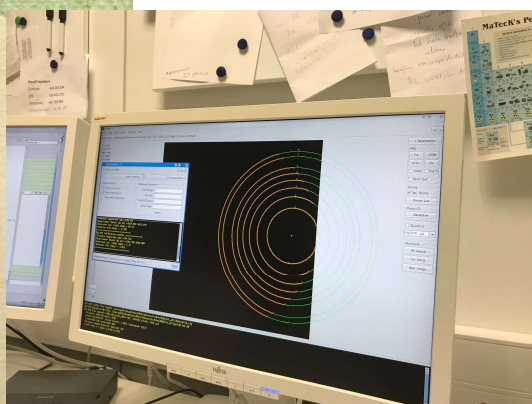
Glass



Ceramic



Metal



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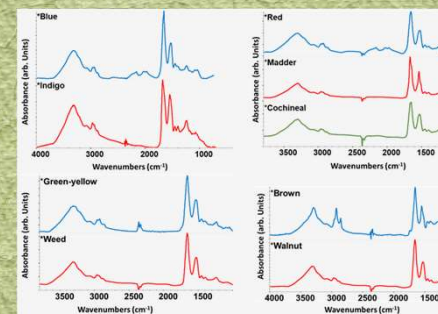


Hadian, Madani, Kamel, Rozatian; Beamtimes at IR Beamline, SESAME, Allan, Jordan; 2019-Present

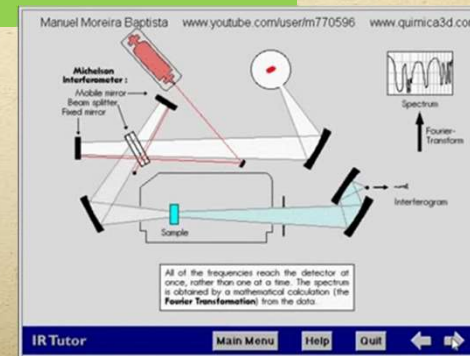
“FTIR Technique: another well known *non-destructive* technique”

Characterization of Dyes used in the Textiles from Historical Salt mine of Chehrabad in Zanzan, Iran

The Saltmen: In 1993, miners unexpectedly discovered a historical natural mummy and its artifacts during the extraction of salt from a mine in Zanzan province, northwest of Iran. Up to now 6 mummies have been found with various objects such as pottery, wood, fabric, and leather. Dating studies showed that these unique works belonged to the miners of the Achaemenid period to the Islamic era.



One of the important issues of archaeological studies in this collection is the recognition of the type of dyes with red, blue, yellow, green and brown used in them.



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Noghani, Hadian, Madani, Emami, Kamel, Harfouche, Khan, Abdellatief, Rozatian; “MS/XRF/IR Beamlines, SESAME, Allan, Jordan, 2022”



Facility	SESAME
Proposal Number	20210013
Proposal Title	Insights into the Origin of Clay and Glaze used in Stoneware Celadons: Synchrotrons based XRD Analysis for Pursuing Maritime Trade in south east Asia



Characterization of Nanoparticles of Nishapur and Susa Luster Ceramics by Using Synchrotron Radiation

Proposal Title	Characterization of Dyes used in the Textiles from Historical Salt mine of Chehrabad in Zanjan-Iran
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Proposal Title	On the trace of Iranian Arsenic Bronze metallurgy, Provenance and mixing
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Proposal Title	SR-FTIR light through 7000 years old pigments on ceramic surfaces
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Proposal Title	Synchrotron X-ray absorption fine structure (XAFS) for chemistry and characterization of early glasses from 2nd millennium B. C., Iran
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Glass



Ceramic



Metal




Fabric

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BL01-MIRAS Beamline, ALBA, Barcelona, Spain; 2022




**ALBA**

Date: 23-11-2021 [ALBA User Office](#)

Dear **Dr Rozatian**,

We are pleased to announce you that your proposal **202103334**, "**Paper and Ink Studies of Ancient Manuscript with Synchrotron IR Microspectroscopy**", submitted for beam line BL01 - MIRAS, was graded A+.

 **>900 years old unique manuscript**

-  Glass
-  Ceramic
-  Metal
-  Fabric
-  Ink
-  Paper



HESEB Helmholtz-SESAME
Soft X-Ray Beamline
for SESAME

✓ A Free Electron Laser for the Middle East
✓ “Why Not?”



Thank you very much for your kind attention



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