

OBRA DIOCESANA SANTO DOMINGO DE SILOS, ZARAGOZA

PEPE'S MURDER

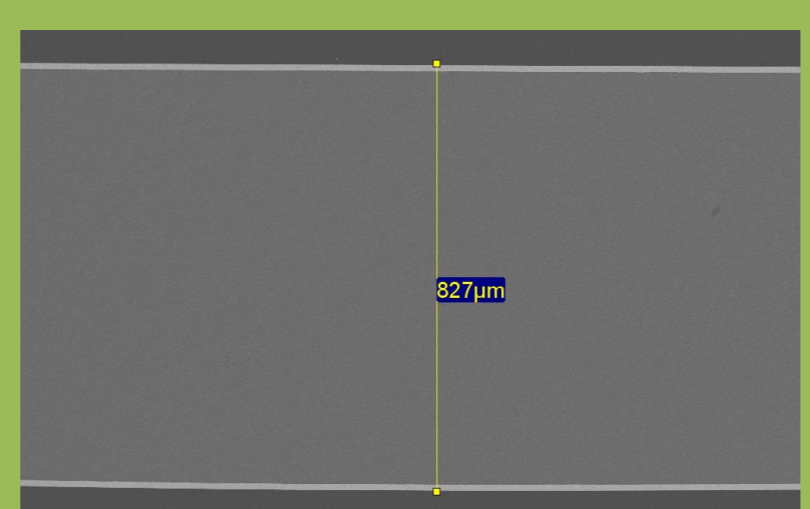
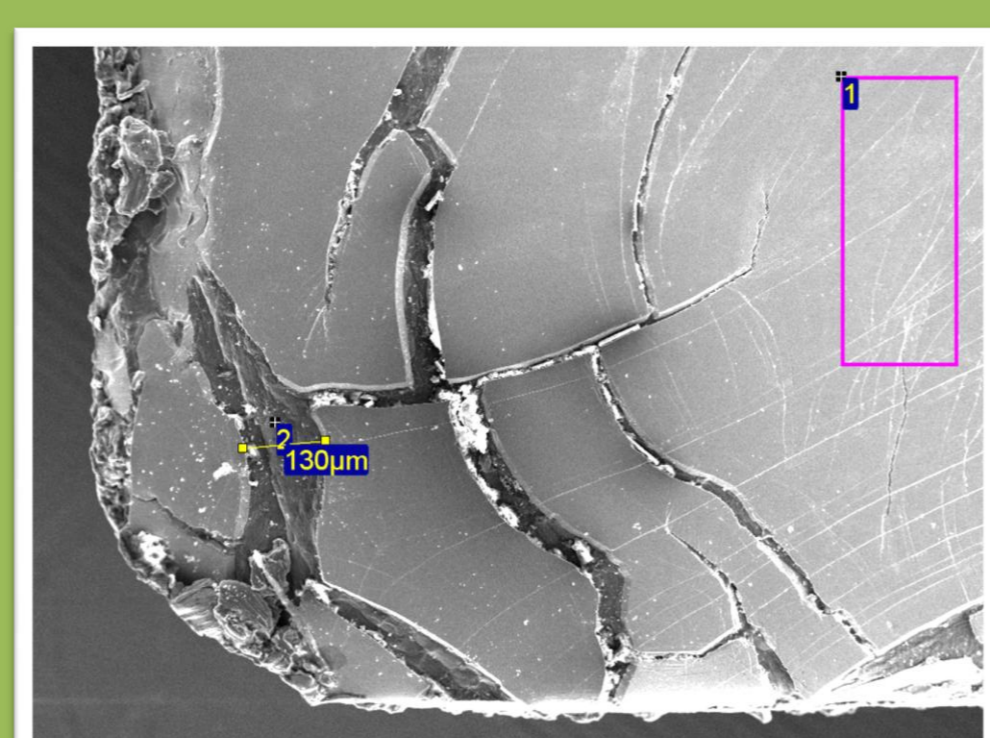
We found an object in the crime scene and we performed a series of experiments in order to discover what kind of material it was. Before going to the Science Faculty at the University of Zaragoza, we run a few tests on the object at school. We discovered it was a thermal and electrical conductor and analyzing its density, we supposed it was aluminium. In this poster, we describe the techniques we used at College's laboratories.



SCANNING ELECTRON MICROSCOPE (SEM)



Discovered the local chemical composition of the surface and cross section.



Results:

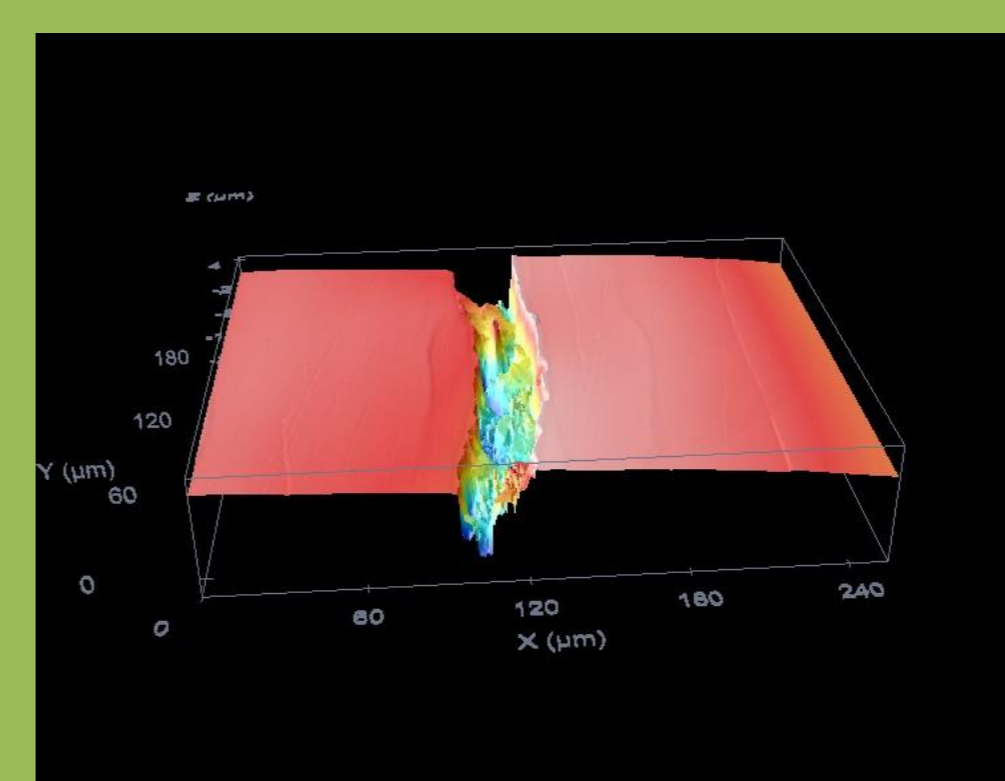
	Material	Percentage (w)
Core	Al	100
	Cr	5.3
Surface	Co	2.6
	Ni	81.07

CONFOCAL LASER SCANNING MICROSCOPY

The scanning of the surface shows 3D picture of cracks and their profiles.

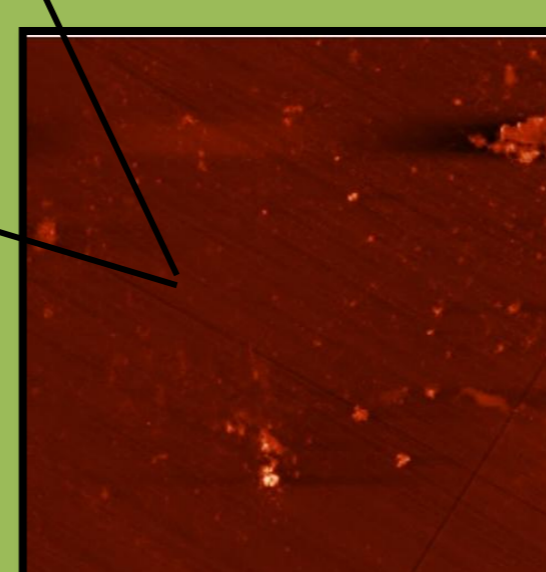
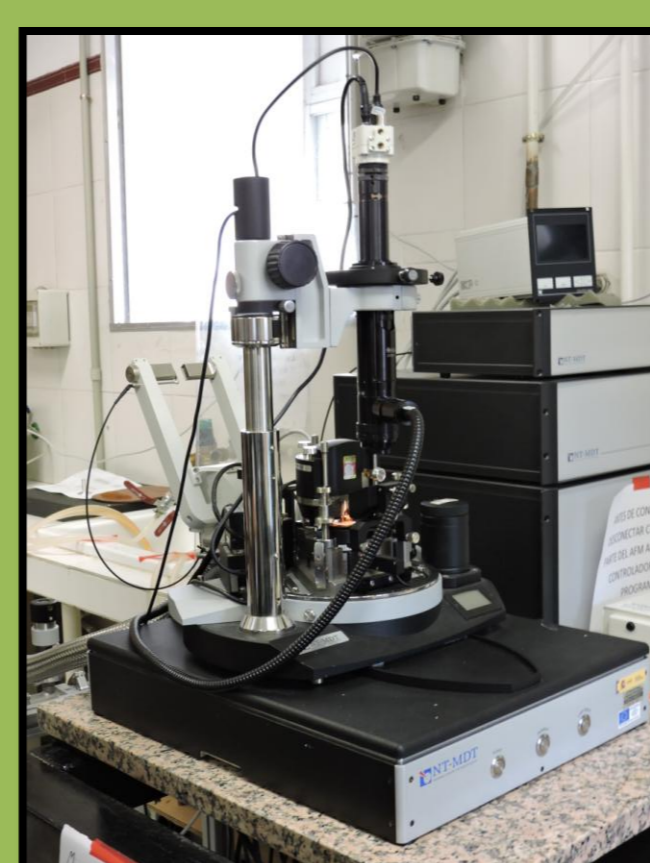


Results:



ATOM AND MAGNETIC FORCE MICROSCOPY

Using a silicon coating tip, images based on the magnetic field of each point of the surface are created.



Results:

Ordered marks were discovered throughout the surface which correspond to magnetic domains, even though the preliminary analyses of the sample didn't show magnetic properties.

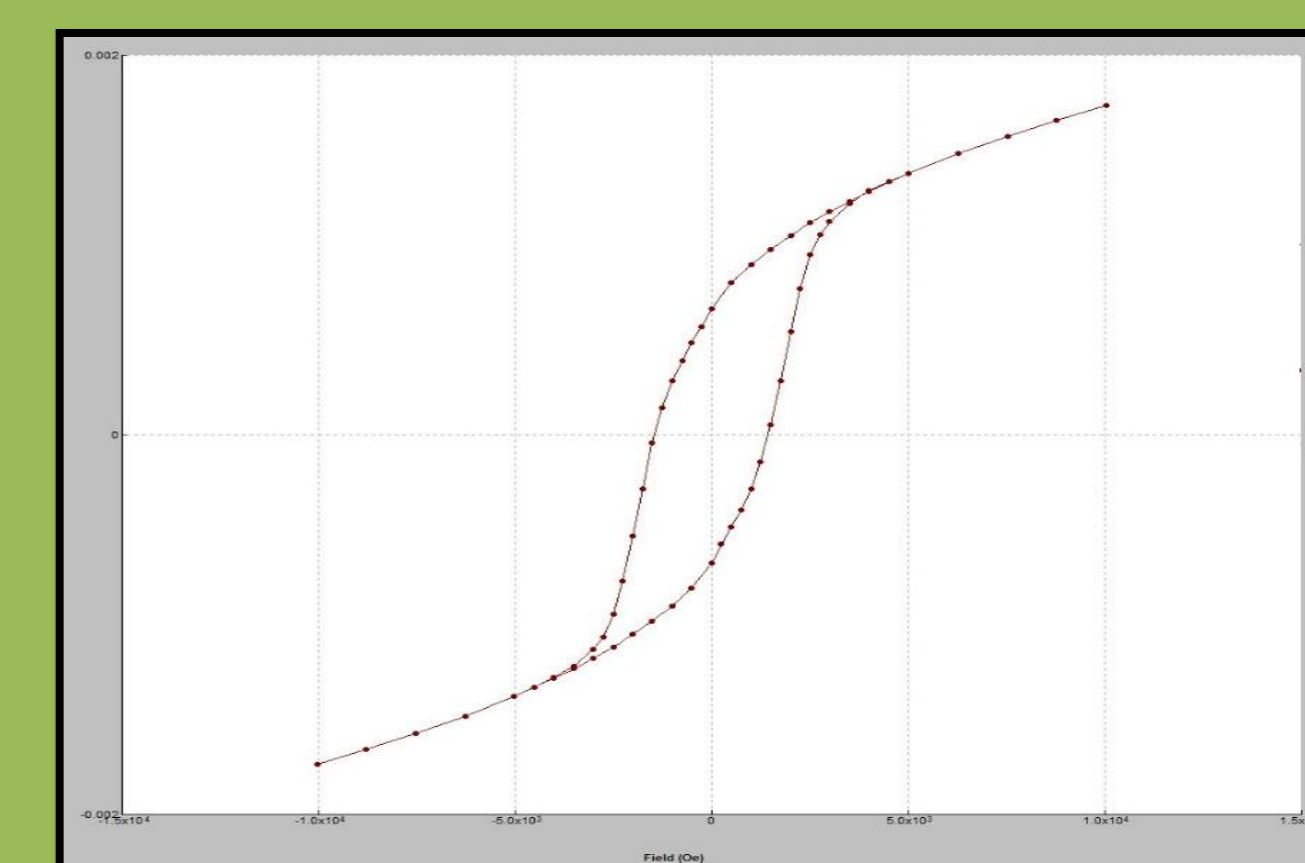
MAGNETIC SUSCEPTIBILITY MEASUREMENT



This technique let us study the magnetic properties of the material by creating an intense magnetic field with the help of a superconducting coil.

Results:

We discover it is a medium ferromagnetic material because its polarity is easily reverse.



Conclusions: we have solved the mystery.

- ✓ In the first test, we reach the conclusion that the sample contains aluminium and the surface has a thin layer made of chromium, cobalt and nickel.
- ✓ In the second test, we realized that the surface is not as smooth as we thought and has cracks on the edges.
- ✓ In the third and fourth test, we deduced that the sample gets magnetic properties due to the magnetic domains. Its polarity can be easily reversed, so it is a medium ferromagnetic material.

With all these evidences we conclude that the unknown material is **a piece of hard disk** due to its supposed ability to save and delete information thanks to magnetism and its easily changeable polarity.

References:

Data provided by the University.
Photos taken by us.
Results obtained in the experiments.



Acknowledgements:

We thank the organizers of the programme for giving us the opportunity to participate in it. We also thanks teachers who led us to develop the research and showed how scientists work with scientific instruments.