

# X-Ray Photoelectron Spectroscopy

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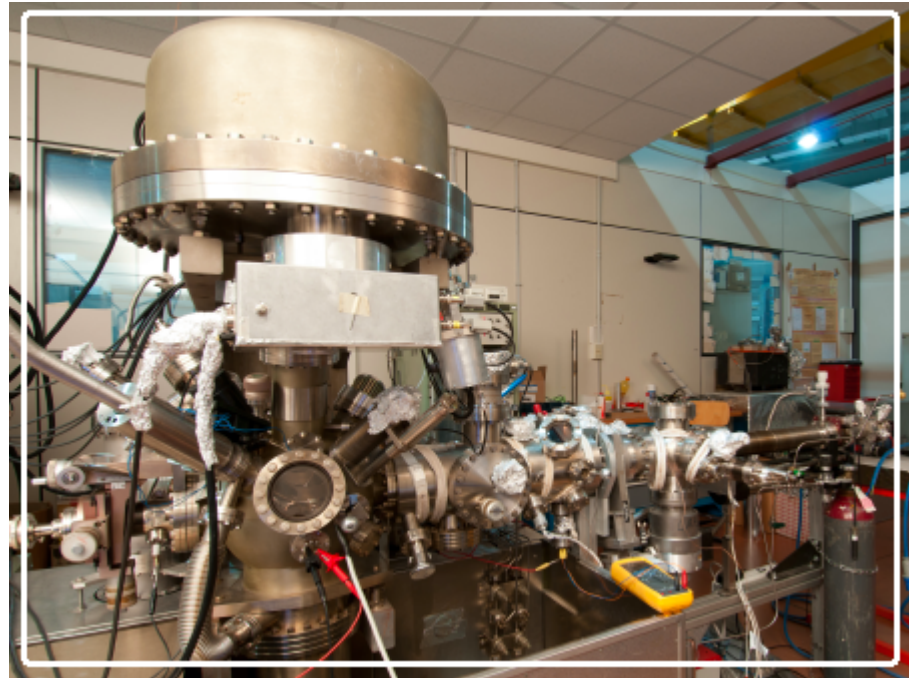
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EXPERIMENT



Collection of  
(usually high amount of)  
DATA



Example: your experience at ESCALAB @Elettra  
Collection of X-Ray Photoelectron Spectroscopy Data

Ok... and now?

Data need to be processed, understood...

...and maybe your findings should be  
organized, reported and made available  
to the scientific community

RAW DATA  
("columns of numbers")

```
Pd_aCNT_smp1_001.txt - Blocco note
File Modifica Formato Visualizza ?
|IGOR
|WAVES/D Pd_aCNT_smp1_001Cts Pd_aCNT_smp1_001BE
|BEGIN
|4257      1095.354
|4228      1094.354
|4185      1093.354
|4170      1092.354
|4342      1091.354
|4260      1090.354
|4126      1089.354
|4207      1088.354
|4142      1087.354
|-----
```

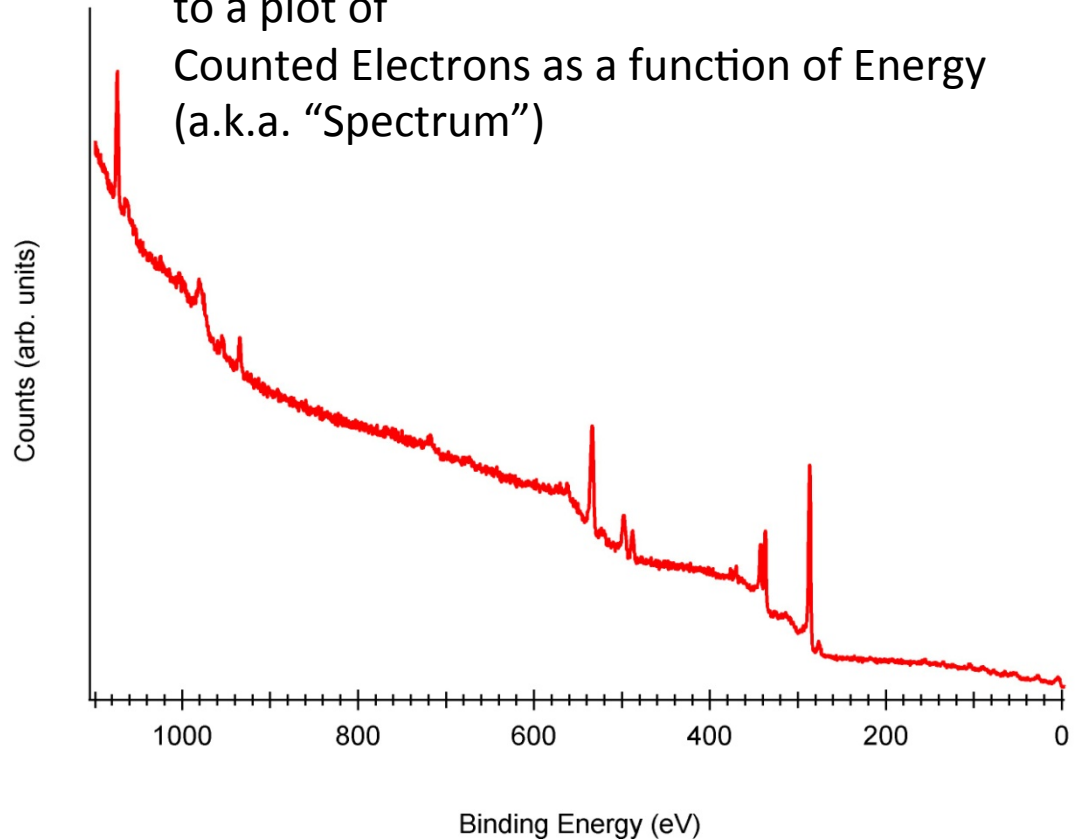
## DATA PROCESSING (1)

converting "meaningless"  
numbers

into

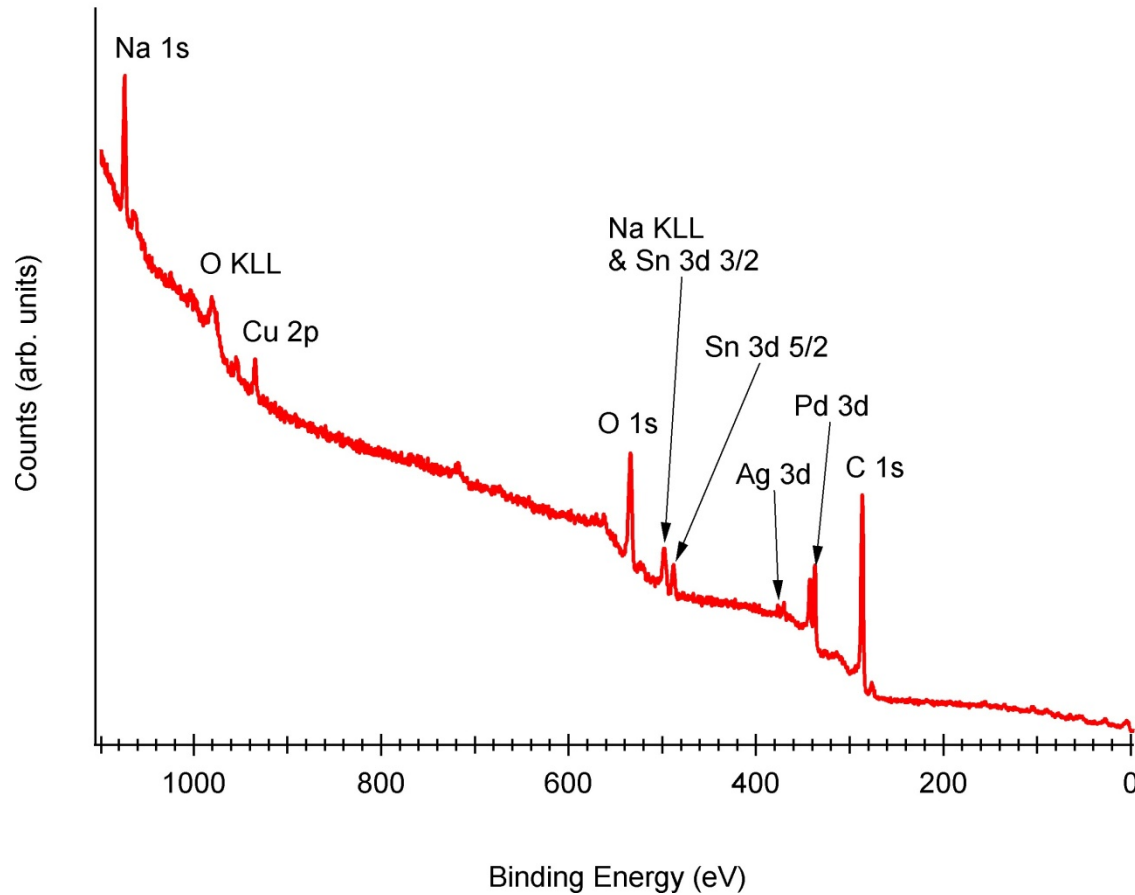
plots, tables,  
images etc...

Example: from XPS raw data (2 columns – txt file)  
to a plot of  
Counted Electrons as a function of Energy  
(a.k.a. "Spectrum")



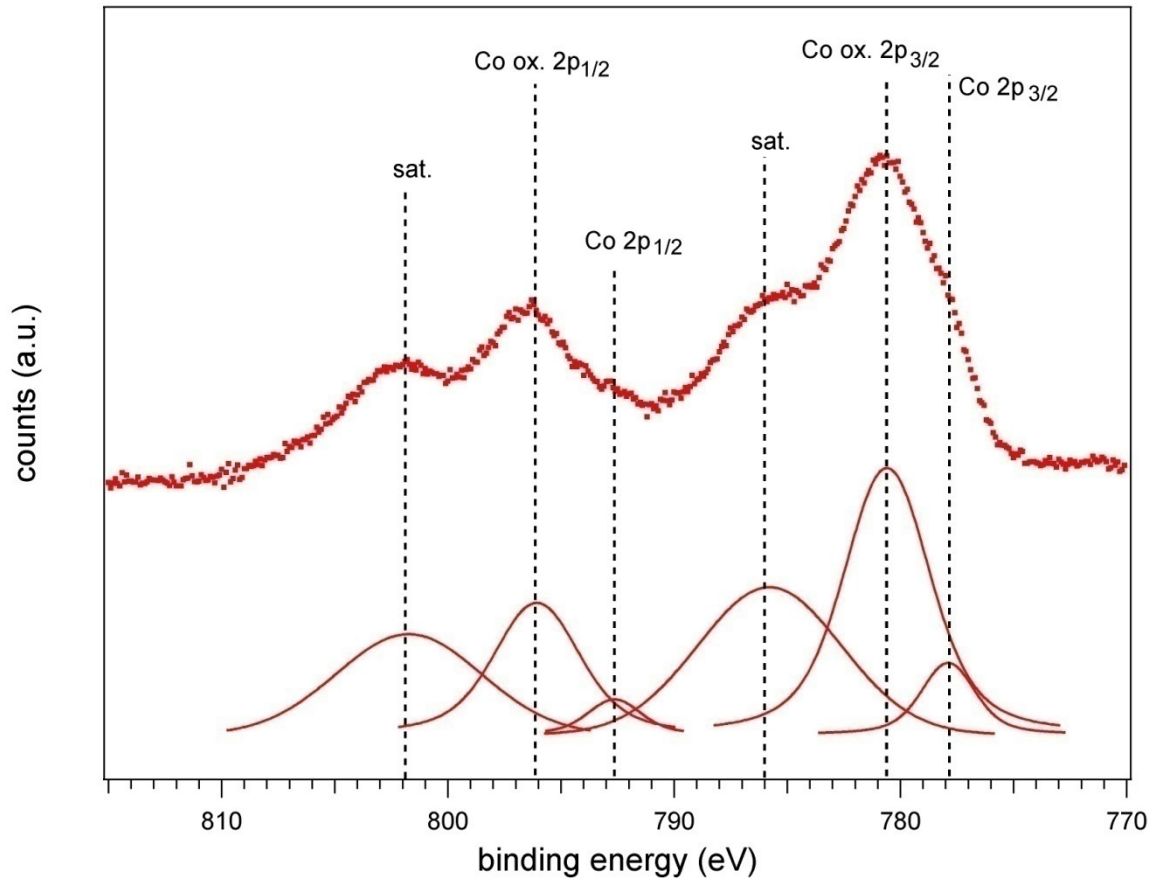
# DATA INTERPRETATION

Example: assign XPS peaks to elements / transitions  
→ identify elements on sample surface



## DATA PROCESSING (2)

Example: mathematical processing of data points  
(curve fit, baseline subtraction, area calculation etc.)



elements / transitions assignment

Data points

(possible) Fit curves

# **SCIENTIFIC PAPER**

## **What is a Scientific Paper?**

(from “Scitable – Nature Education – Writing Scientific Papers”)

“Scientific papers are for sharing your own original research work with other scientists or for reviewing the research conducted by others. As such, they are critical to the evolution of modern science, in which the work of one scientist builds upon that of others. To reach their goal, papers must aim to inform, not impress. They must be highly readable — that is, clear, accurate, and concise. They are more likely to be cited by other scientists if they are helpful rather than cryptic or self-centered”



# **TYPICAL STRUCTURE OF A SCIENTIFIC PAPER**

**TITLE**

**AUTHORS**

**ABSTRACT**

**KEYWORDS**

**INTRODUCTION**

**MATERIALS AND METHODS**

**RESULTS**

**DISCUSSION**

**ACKNOWLEDGMENTS**

**REFERENCES (CITED LITERATURE )**

**PAPER BODY**

***“IMRaD”***

**(Intro, Materials, Results and Discussion)**

# TYPICAL STRUCTURE OF A SCIENTIFIC PAPER

## ***“IMRaD”***

**Introduction** - Why was the study undertaken? What was the research question, the tested hypothesis or the purpose of the research?

**Methods** - When, where, and how was the study done? What materials were used?

**Results** - What answer was found to the research question; what did the study find? Was the tested hypothesis true?

and

**Discussion** - What might the answer imply and why does it matter? How does it fit in with what other researchers have found? What are the perspectives for future research?



# **TYPICAL STRUCTURE OF A SCIENTIFIC PAPER**

## **TITLE**

The title describes the subject of the article. It should be specific enough to describe the contents of the paper and appropriate for the intended audience.

## **AUTHORS**

People who made substantial contributions to the work are listed as “authors”. First author is generally the person who did the work and wrote the paper

## **ABSTRACT**

Abstract or summary gives the reader a "preview" of the paper. An effective abstract can be fully understood even without reading the paper. It should be a short paragraph (100-250 words), summarizing the purpose, methods, results and conclusions.

# **TYPICAL STRUCTURE OF A SCIENTIFIC PAPER**

## **INTRODUCTION**

What was your experiment about? Why is it so interesting?

Introduction clarifies the motivation of your work, summarizing the relevant literature, and prepares readers for the structure of the paper.

## **MATERIALS AND METHODS**

This section should give enough details to allow other scientists to repeat your experiment.

## **RESULTS**

This is where the results are presented, usually by means of plots and tables. Main findings are also summarized in the text.

# **TYPICAL STRUCTURE OF A SCIENTIFIC PAPER**

## **DISCUSSION**

Most significant results are highlighted in this section (not as a mere repetition of Results section!). Relation between these results and the original questions / hypothesis, consistency (or inconsistency) with previously reported investigations are discussed here. If your results were unexpected, an explanation/interpretation should be given. Further research, that would be necessary to answer the questions raised, are sometimes proposed.

## **ACKNOWLEDGMENTS**

This section is optional. You can thank those who helped somehow, or made other important contributions.

## **REFERENCES (CITED LITERATURE )**

Listed and formatted according Journal rules (title, journal name, affiliation of authors etc.)

# **TYPICAL STRUCTURE OF A SCIENTIFIC PAPER**

## **OTHER IMPORTANT POINTS**

- Category of papers (Technical, Review, Short letter..)
- Importance of KEY WORDS (indexing)
- Journal Choice (topic relevance, audience, impact factor..)

## REFERENCES

**“Writing a Scientific Paper” (Columbia University)**

<http://www.columbia.edu/cu/biology/ug/research/paper.html>

**“Writing Scientific Papers” (Scitable – by Nature Education)**

<http://www.nature.com/scitable/ebooks/english-communication-for-scientists-14053993/118519636>

**“Academic Publishing” (Wikipedia Page)**

[https://en.wikipedia.org/wiki/Academic\\_publishing](https://en.wikipedia.org/wiki/Academic_publishing)