

TE<sup>4</sup>CHING  
LEARNING @UNIPD

**Persone, Ambienti, Didattica:**  
verso un modello integrato per l'innovazione



UNIVERSITÀ  
DEGLI STUDI  
DI PADOVA

18 e 19 maggio 2023

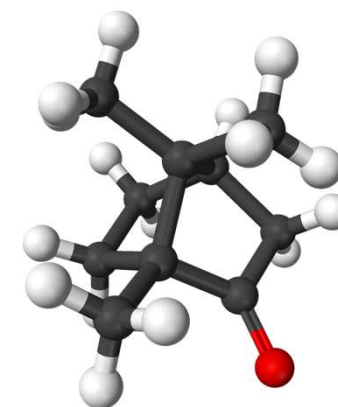
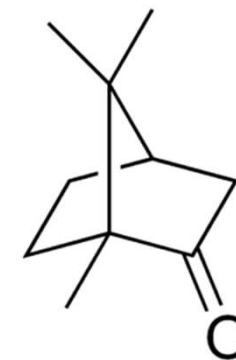
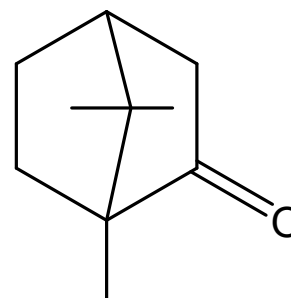
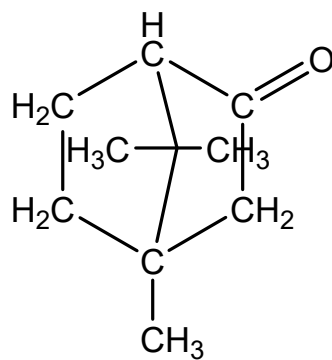
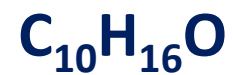
***“Visualizzare e Insegnare la chimica attraverso la  
rappresentazione Tridimensionale in Aula e in  
Laboratorio (VIRTUAL)”***

Relatore: Prof. Giulia Licini



## Molecular visualization in chemistry is fundamental

### Camphor





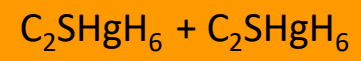
**VIRTUAL** represents an integrated approach to molecular representation, from minimal formula to three-dimensional structures

- **Visualisation of molecules (G. Licini, L. Orian, R. Pilot, C. Zonta)**
- **Bring the lab into the classroom (M. Carraro)**

**VISUAL ... isation**

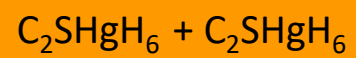
## VISUAL ... isation

Molecular formulas



## VISUAL ... isation

Molecular formulas

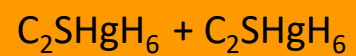


Condensed structural formulas



## VISUAL ... isation

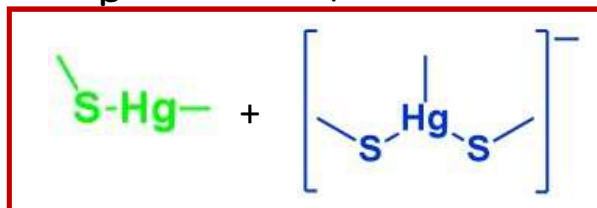
Molecular formulas



Condensed structural formulas

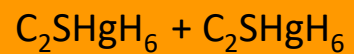


Structural formulas



## VISUAL ... isation

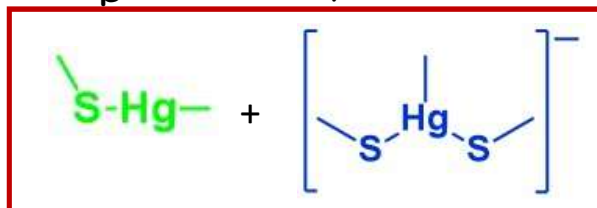
Molecular formulas



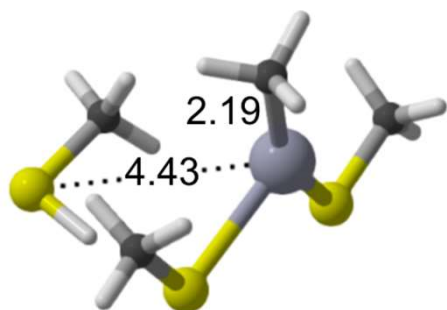
Condensed structural formulas



Structural formulas



3D ball and stick formulas





## VISUAL ... isation

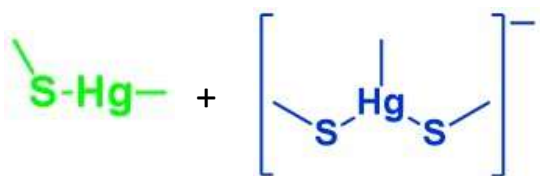
Molecular formulas



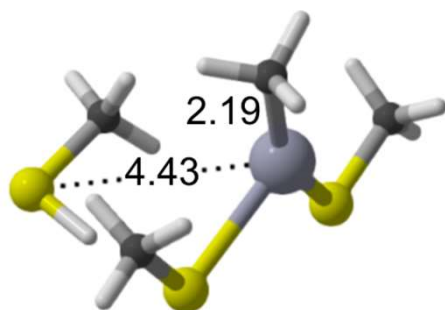
Condensed structural formulas



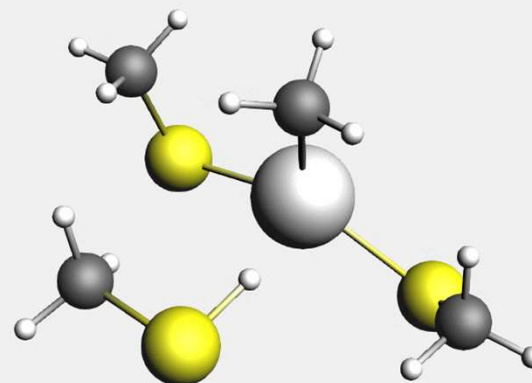
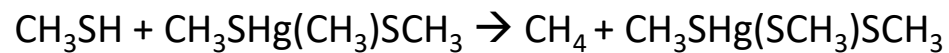
Structural formulas



3D ball and stick formulas

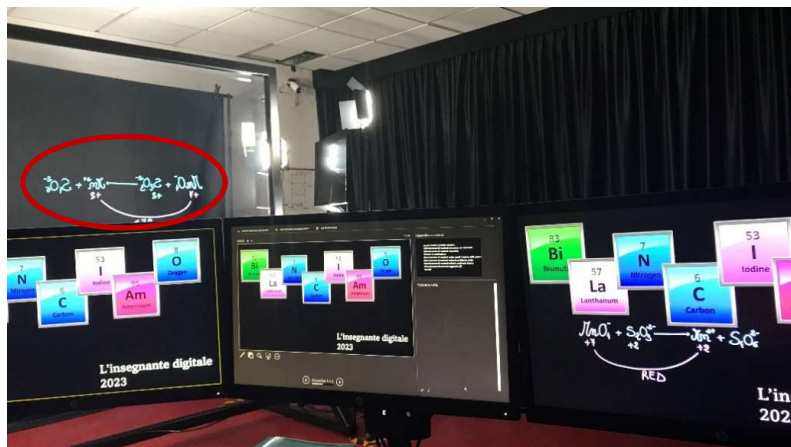


## Chemical reaction



# All this ... and more on BOA!

Writing chemical formulas

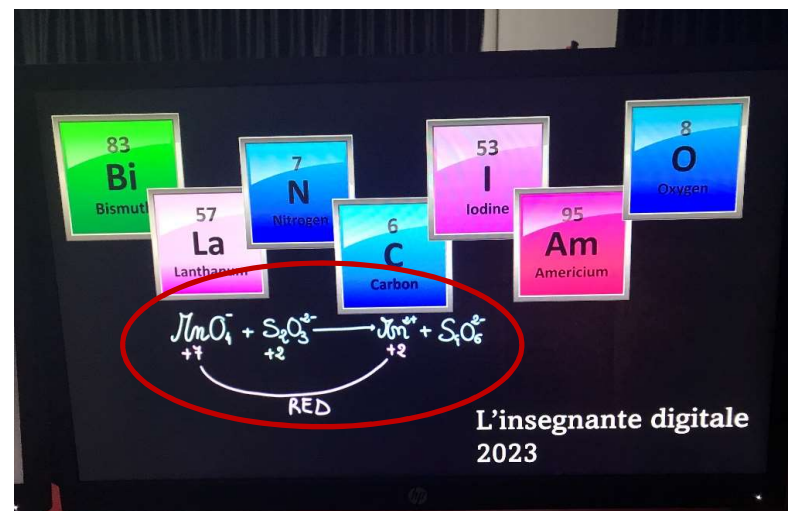


# 2023

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**MOOC in preparation**

Merging them in videos



# Bring the lab into the classroom

**Demonstrations of laboratory procedures and use of scientific instrumentations in the classroom before entering the lab**

- **The multimedia system helps during the introductory lessons**
- **Optimal visual explanation of simple procedures or use of instruments, avoiding explanations in small spaces with large groups of students**
- **More aware approach to the practical procedures and use of scientific instrumentations and workstations**
- **The experiment can be carried out in synchronous or asynchronous mode (preparation of a video archive)**





# Multimedial station laboratory - classroom

- 2 mobile high definition cameras
- Camera Controller (*Minrray KDB2000*)
- Signal Converters
- Notebooks





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**Laboratory Preparazione e Caratterizzazione dei Materiali II (I year Laurea  
Magistrale in Scienza dei Materiali)**

**Laboratory of Green Chemistry and Innovative Chemical Processes  
(1st year LM Sustainable Chemistry and Technologies for a Circular Economy)**



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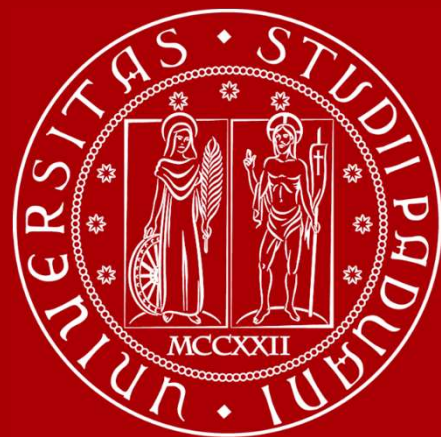
## Acknowledgements

**Laura Orian, Mauro Carraro, Robertino Pilot, Cristiano Zonta**

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**Technical staff and administration Dipartimento Scienze Chimiche**

**In particular: Simone Crivellaro, Giampietro Sella, Claudio Comaron, Luigino Feltre**



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