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My experience at the Advanced Materials Lab

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Training involved in the Labotatory

1. Slip, trip and fall training
   - Taught safe walking techniques on a slippery surface.

2. Pressure safety training
   - Taught safe handling of Dewers and materials under pressure.

3. ES&H traning
   - Taught how to maintain a safe environment while working in the lab.

Equipment used in the lab.

Safety goggles.

Liquid Nitrogen dewers.

Picture of me will be here

Schlenk Flasks

Instruments used to carry out reactions

Schlenk line setup.

Characterization of reactions requires many instruments.

Single Crystal XRD (X- Ray diffraction)

EA (Elemental Analysis)

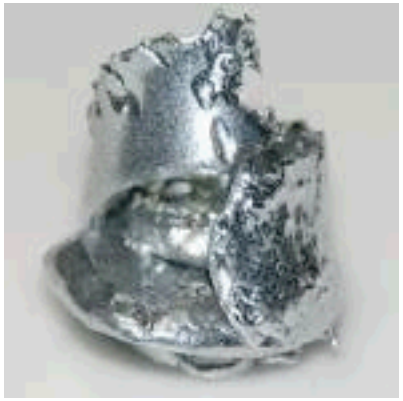
FTIR (Fourier Transform Infrared Spectroscopy)

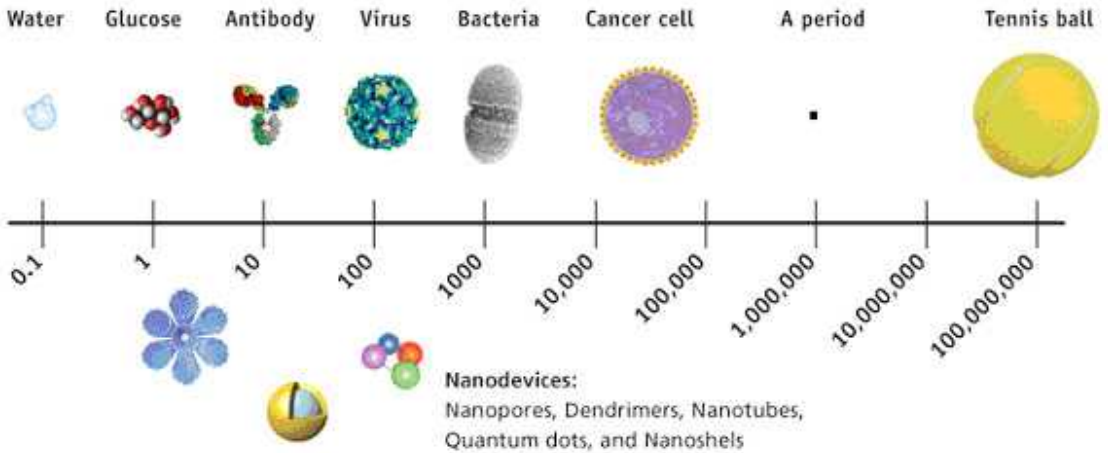
NMR (Nuclear Magnetic Resonance)

Nano-Ga_2O_3 are of interest due to the potential unique electrochemical properties.

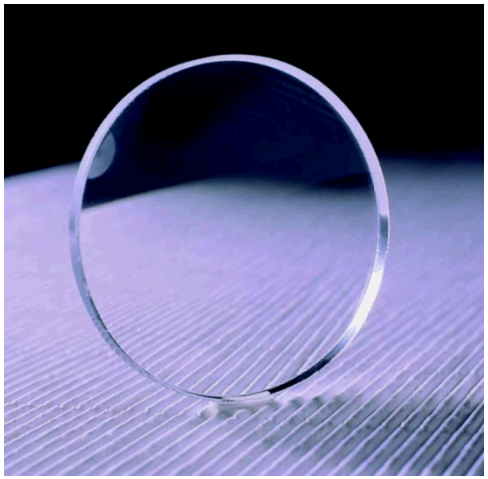
Nano is the scale of anything from 1-100 nanometers.

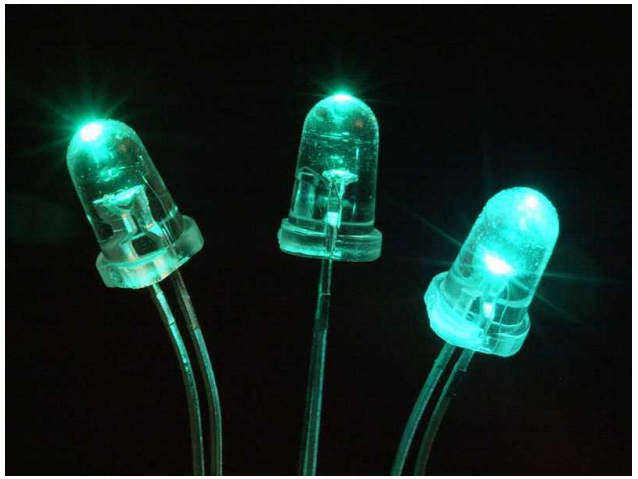
A nanometer is 10^{-9} m.

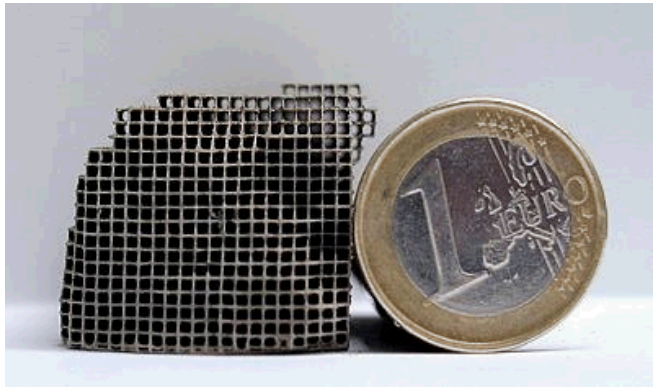




Gallium oxide (Ga_2O_3) has a wide variety of applciations.





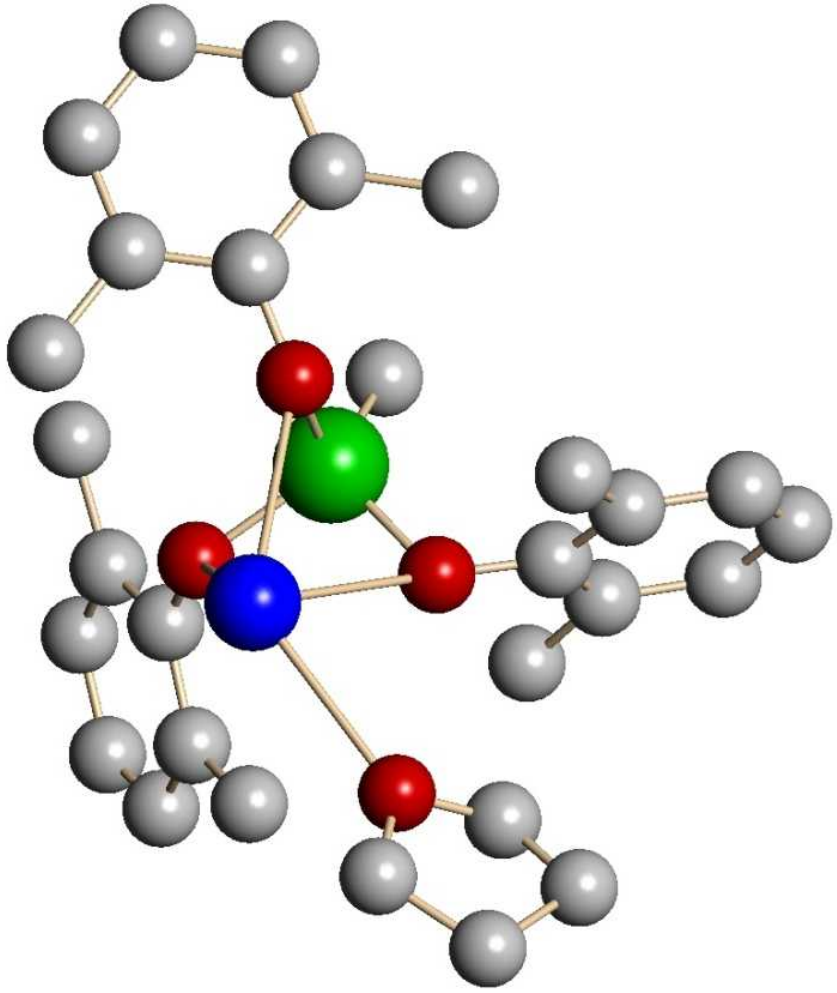


$Ga(NR_2)_3$ Reaction had several surprise results!

$Ga(NR_2)_3 + 3$ H-DMP

↓ tol.

$Ga(DMP)_3 + 3H(NR_2)$



$(THF)K(\mu\text{-}DBP)_3Ga(CH_3)$

Green= Gallium
Red= Oxygen
Grey= Carbon
Blue= Potassium

Alternate preparation of Ga(NRR')3

$$\text{Li-Bu}^n + \text{H-NRR'} \xrightarrow{\text{Hexanes}} \text{Li-NRR'} + \text{H-Bu}^n$$

$$GaCl_3 + 3\ \text{Li-NRR'} \xrightarrow[0^\circ\ C]{\text{THF}} Ga(NRR')_3 + 3\ LiCl$$

NRR'= tert-butyl trimethyl silyl amine.

$[Ga(NRR')_3]$

Preparation of $Ga(NMe_2)_3$

$$GaCl_3 + 3LiNMe_3 \xrightarrow[0^\circ C]{THF} Ga(NMe_2)_3 + 3LiCl$$

$Ga(NMe_2)_3$