

Properties

- Organic aromatic hydrocarbon
- Colorless, sweet-smelling and highly flammable liquid
- Exists in 3 isomeric forms

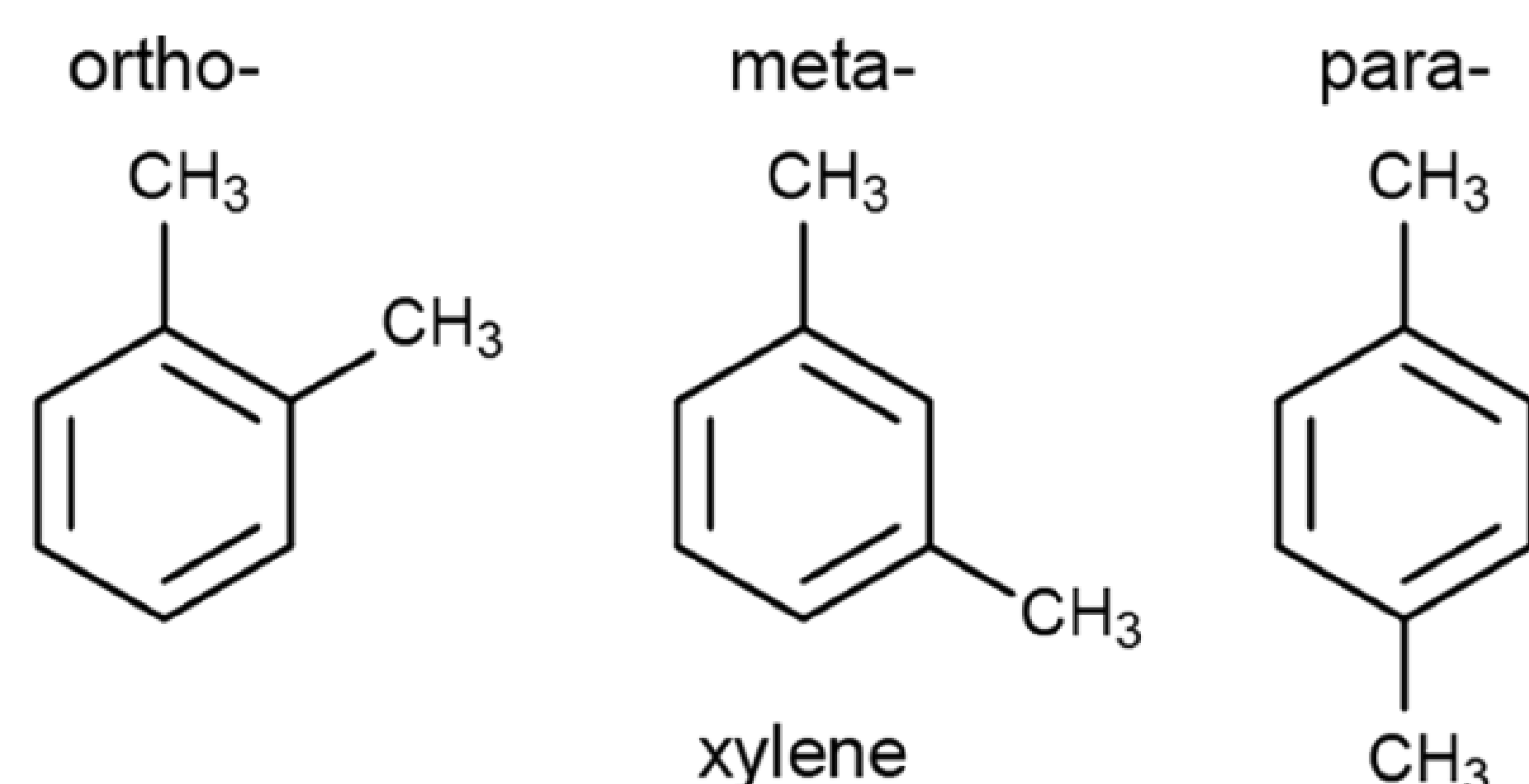


Figure 1. Three isomeric forms of xylene
Source: <http://encyclopedia2.thefreedictionary.com/Xylenes>

Occupational Uses

- Solvent
- Paint Thinner
- Cleaning agent

Occupational Exposure

- Painters
 - Used as a paint thinner
- Biomedical laboratory workers
 - Used for fixing tissue specimens and rinsing stains
- Wood processing plant workers
 - Used for cleaning of wood

Toxicological Data

- Routes of Exposure: inhalation, dermal, ingestion
- Health Effects:
 - Acute health effects: severe abdominal pains, nausea, vomiting, possible loss of consciousness
 - Chronic – laryngitis, bronchitis, bronchial pneumonia
- Known to be a non-carcinogen
- Animals studies showed high exposure can cause harmful effects in the liver, kidneys, lungs, heart and nervous system

Occupational Exposure Limits (OELs)

- OSHA Permissible Exposure Limit (PEL)
 - 8-hr TWA - 100 ppm
- NIOSH Recommended Exposure Limit (REL)
 - 10-hr TWA - 100 ppm
 - STEL - 150 ppm
- ACGIH Threshold Limit Value (TLV)
 - 8-hr TWA - 100 ppm
 - STEL - 150 ppm

Sampling Methods

- OSHA Method 1002
 - Sampling media: charcoal tubes
 - Samples are collected with a personal sampling pump calibrated, with the sampler attached, to within $\pm 5\%$ at 50 mL/min.
 - Sampling media: diffusive samplers
 - Samples are collected with SKC 575-002 passive samplers.



Figure 2. Activated charcoal tubes and diffusive samplers
Source: www.skcinco.com



Figure 3. Raynaud's phenomenon
Source: http://www.medicinenet.com/raynauds_phenomenon/page4.htm

Analytical Methods

- Gas chromatography (GC) equipped with a flame ionization detector (FID)

Highlighted Worker Exposure

- Biomedical laboratory technicians who work with toluene and xylene double their chances of developing Raynaud's phenomenon.
- Those who also worked with acetone or chlorinated solvents were 9 times more likely to develop Raynaud's phenomenon.
- Exposure to xylene is through handling wet sample slides without gloves.

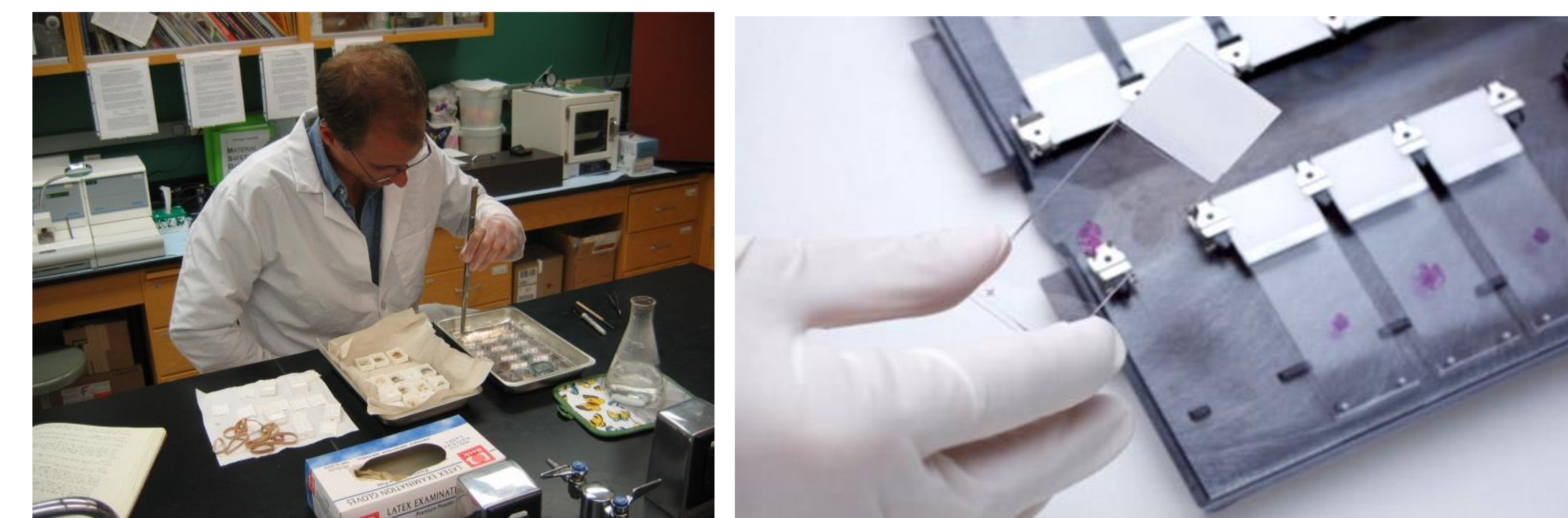


Figure 4. Xylene is a solvent used in biomedical labs to fix tissue specimens.
Sources: <http://esp.gmu.edu/wp-content/uploads/2013/05/HistologyLab2.jpg>
<http://www.precisionhistologylab.com/assets/images/phlIndexBanner.jpg>

Control Measures

- Engineering controls: substitution, enclosure, local exhaust ventilation, non-sparking ventilation systems
- Administrative controls: Worker rotation to limit the exposure time
- Personal protective equipment (PPE): eye/ face protection, gloves, boots, aprons, and a NIOSH-approved air-purifying respirator with an organic vapor cartridge (up to 900 ppm)

References

- Occupational Safety and Health Administration (OSHA). Xylene sampling method. https://www.osha.gov/dts/chemicalsampling/data/CH_276400.html
- Xylene Poisoning in Laboratory Workers: Case Reports and Discussion. <http://labmed.oxfordjournals.org/content/11/9/593.abstract>
- Health of Pathology Laboratory Technicians at Risk from Common Solvents like Xylene and Toluene. <http://www.darkdaily.com/health-of-pathology-laboratory-technicians-at-risk-from-common-solvents-like-xylene-and-toluene-070511#axzz44b6FYPlj>
- Occupational Safety and Health Administration (OSHA). Safety and Health Topics: Laboratory. <https://www.osha.gov/SLTC/etools/hospital/lab/lab.html#Toluene,Xylene,orAcrylamideExposure>
- Agency for Toxic Substances and Disease Registry (ATSDR). Xylene: Relevance to Public Health. <http://www.atsdr.cdc.gov/toxprofiles/tp71-c2.pdf>
- EPA fines Construction Supply Company \$15,000 after Acetone and Xylene spill. <https://spillready.com.au/uncategorized/epa-fines-construction-supply-company-15000-acetone-xylene-spill/>