

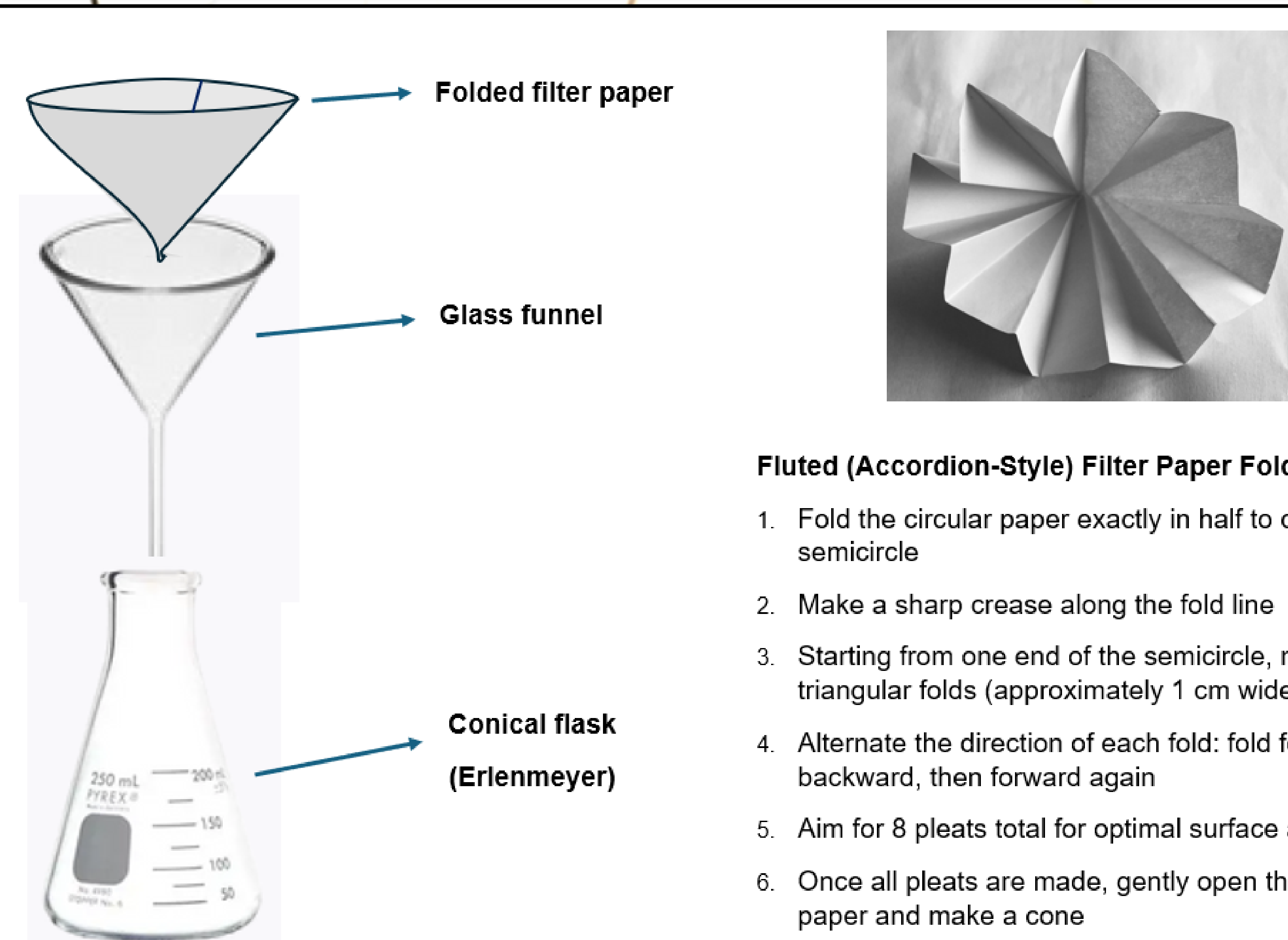
Constantinos D. Zeinalipour-Yazdi

*Faculty of Computing, Mathematics, Engineering and Natural Science (CoMENS), Northeastern University London, One
Portsoken, Portsoken Street, London, E1 8PH, UK*

Abstract

This poster presents four fundamental analytical chemistry techniques commonly employed in undergraduate laboratory coursework. In these experiments students obtain laboratory notebook skills, safety awareness, teamwork abilities, and the crucial connection between theoretical chemistry concepts and practical experimental verification. Students learn that chemistry is both an intellectual discipline and a hands-on science requiring careful observation, precise measurement, and critical thinking about experimental results.

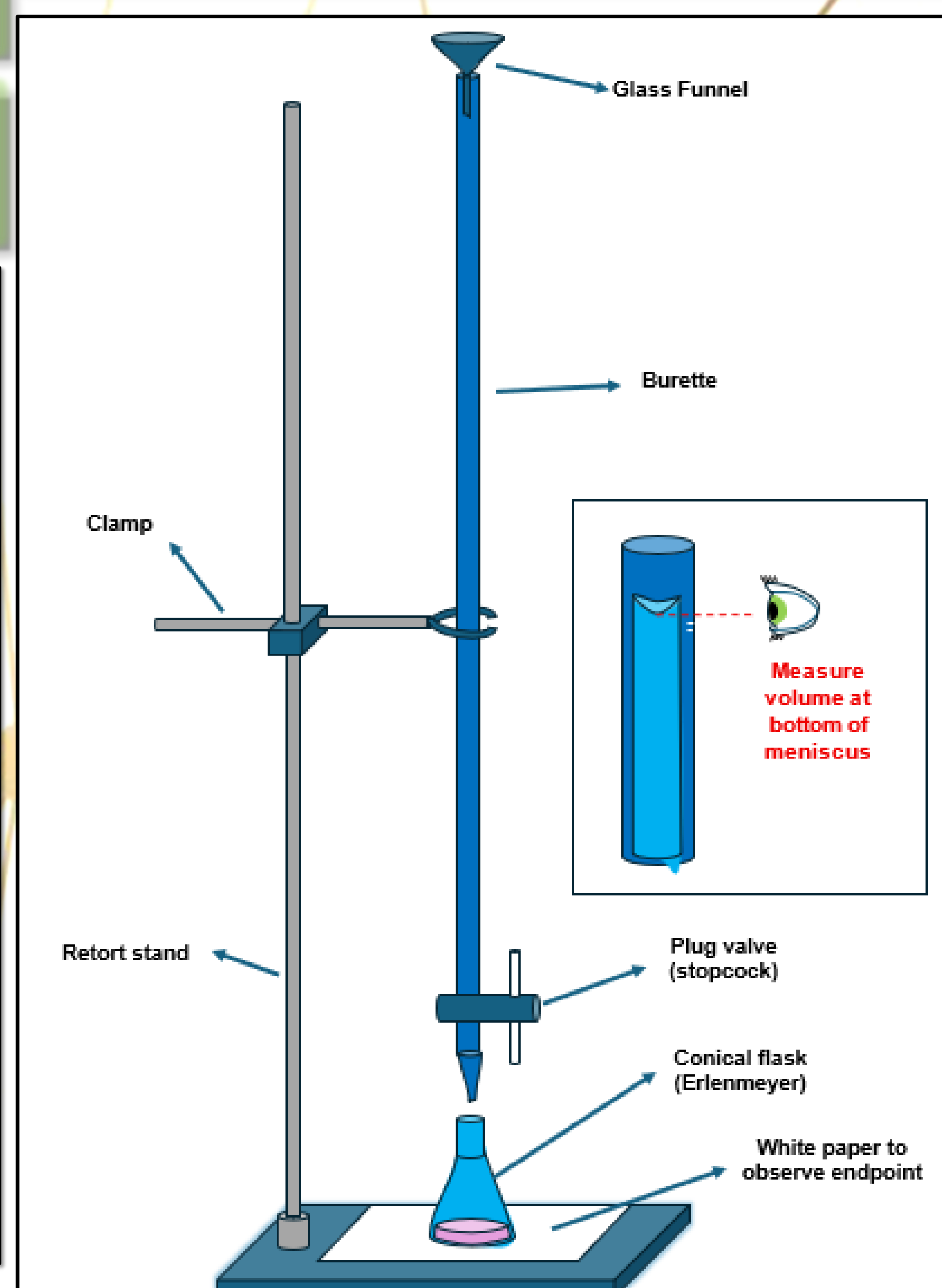
Gravity filtration utilizes gravitational force to separate solid particles from liquid solutions through porous filter paper. Fluted filter paper folding that increases the surface area of the filter and enhances the filtration speed.



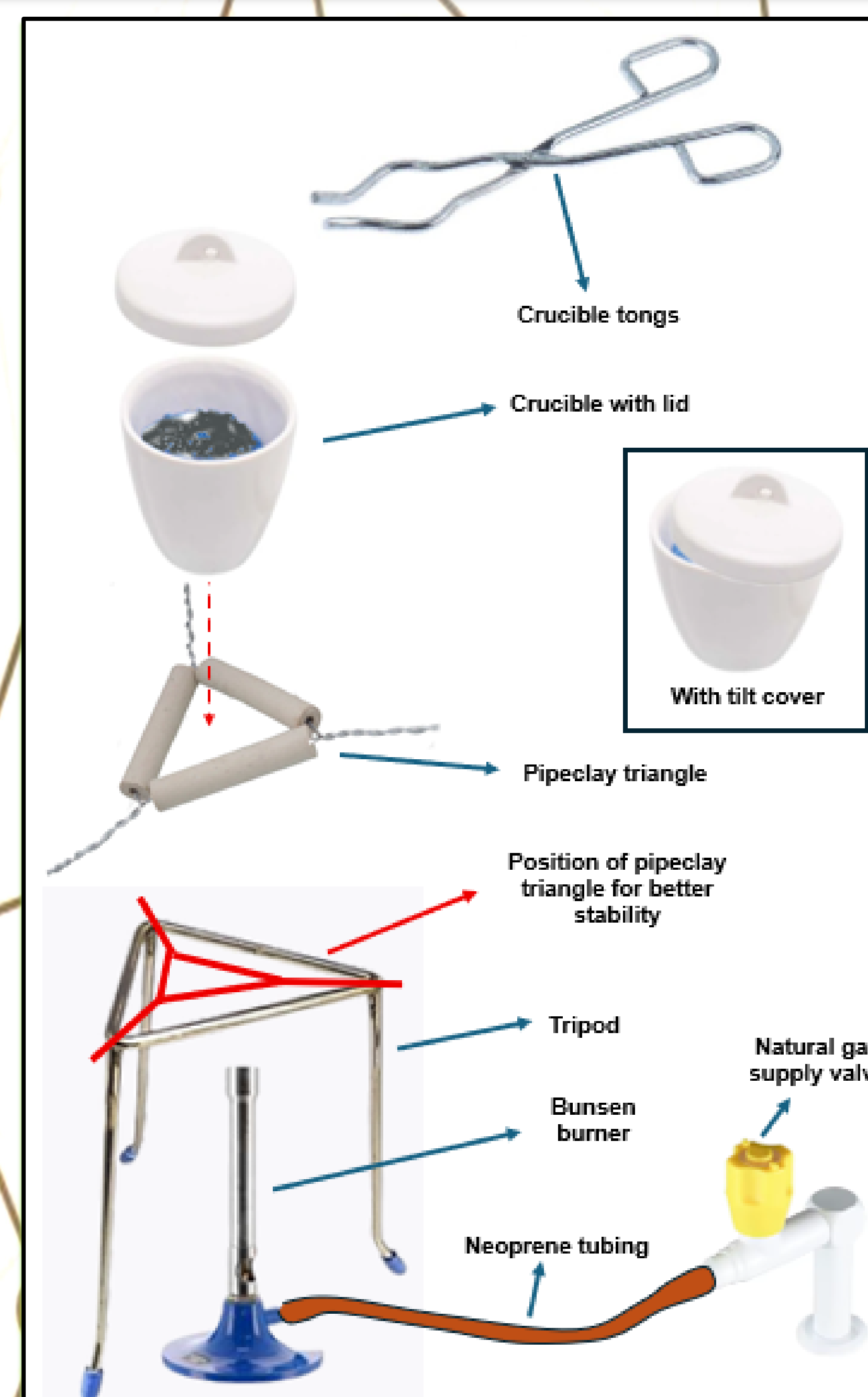
Fluted (Accordion-Style) Filter Paper Folding Method

1. Fold the circular paper exactly in half to create a semicircle
2. Make a sharp crease along the fold line
3. Starting from one end of the semicircle, make small triangular folds (approximately 1 cm wide)
4. Alternate the direction of each fold: fold forward, then backward, then forward again
5. Aim for 8 pleats total for optimal surface area
6. Once all pleats are made, gently open the folded paper and make a cone
7. The tip should be pointed and well-sealed

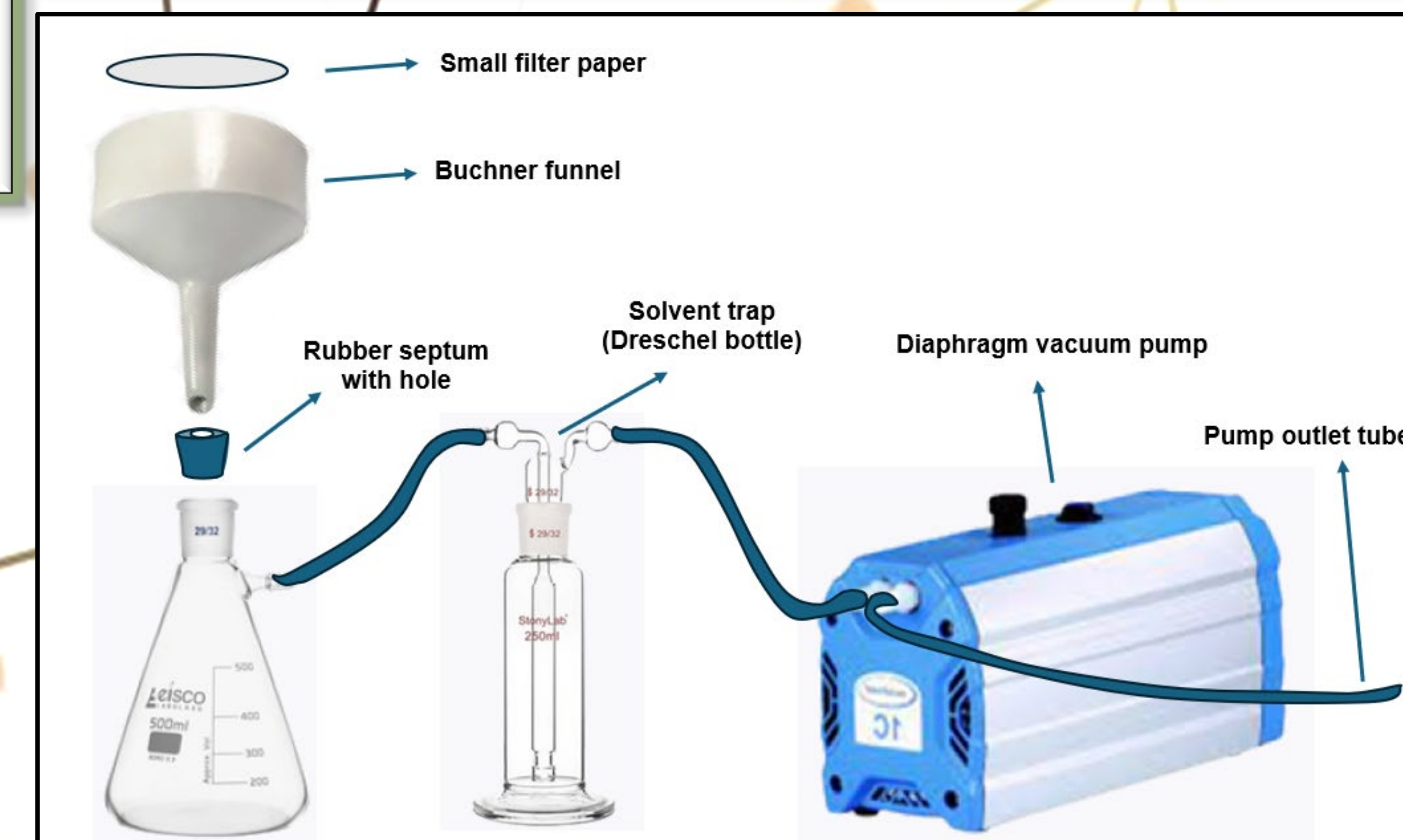
Acid-base titration demonstrates volumetric analysis principles through the controlled addition of a standardized titrant to determine the concentration of an unknown analyte. This technique employs visual or instrumental endpoint detection to establish the equivalence point, enabling precise quantitative determination.



Oxidation of magnesium in a crucible illustrates thermogravimetric analysis and stoichiometric relationships in combustion reactions. Using a Bunsen burner as the heat source, metallic magnesium undergoes complete oxidation to form magnesium oxide ($2\text{Mg} + \text{O}_2 \rightarrow 2\text{MgO}$). Mass measurements before and after heating allow calculation of theoretical versus experimental yield, demonstrating principles of mass conservation and empirical formula determination.



Vacuum filtration employs reduced pressure to accelerate the filtration process, enabling rapid separation of solids from liquids using a Büchner funnel and filter flask assembly, particularly effective for quantitative analysis requiring thorough washing of precipitates.



Conclusions

These four techniques collectively demonstrate essential skills in separation science, quantitative analysis, and high-temperature chemistry, forming the foundation for advanced analytical methods. Each procedure emphasizes accurate measurement techniques commonly used in the general chemistry laboratory that enhance the accuracy and precision of measurements.

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E-mail: constantinos.zeinalipour@nulondon.ac.uk