Introducing the IUPAC Seal of Approval for a wider adoption of IUPAC recommended symbols, terminology and nomenclature: Stage 1—Symbols

IUPAC makes great efforts to standardize chemical nomenclature, symbols, and terms, but it is evident that the authors of textbooks and scientific publications have no motivation for adopting these recommendations. A new project, initiated by the Analytical Chemistry Division in collaboration with the Physical and Biophysical Chemistry Division and the Committee on Publications and Cheminformatics Data Standards, represents the first step to introduce a "IUPAC Seal" to be conferred by IUPAC on books, textbooks or other scientific publications that adopt IUPAC recommendations. The Seal will add value to the work that receives it. This initial project will focus on IUPAC expert review of human-readable depictions of IUPAC symbols in analytical and physical chemistry publications.

For more information and comment, contact Task Group Chair Alessandro Minguzzi <Alessandro.Minguzzi@unimi.it> | https://iupac.org/project/2022-008-4-500/

Effective teaching tools and methods to learn about e-waste

Secondary and University chemical education is critical due to the central role that chemistry plays in sustainable development and developing new, clean technologies. Most students have cell/mobile phones and access to computers, but many may be unaware of end of life or more general life cycle considerations for such devices. Through this new interdivisional project coordinated by CHEMRAWN, educational materials on chemical aspects of e-waste will be gathered and shared widely. 10-12 examples for secondary school or university educators (*e.g.* in-class exercises, laboratory experiments) will be published. This will allow students to learn about e-waste from a chemical perspective and inspire educators to develop their ideas on this important topic related to sustainable chemistry.

The examples will be written-up as articles for a special issue of *Chemistry Teacher International* and contributors invited to take part in a webinar on e-waste education from a chemical perspective.

For more information and comment, contact Task Group Chair Fran Kerton <fkerton@mun.ca> | https://iupac.org/project/2022-016-1-021/

Check-out iupac.org/what-we-do/resources/

A resources page on e-waste has been recently compiled; see iupac.org/e-waste

A Collection of Experimental Standard Procedures in Synthetic Photochemistry*

by Axel G. Griesbeck and Micheal Oelgemoller

Photochemistry has seen a remarkable renaissance in synthetic organic chemistry with numerous new methodologies and protocols in the scientific literature. As a result, photons have been declared a 21st century reagent [1]. Despite this encouraging development, photochemical processes have a longstanding reputation of being complicated, irreproducible, or unreliable. Likewise, the determination of photochemical reaction mechanisms is challenging, as for example expressed by Davidson as early as 1957: "*Photochemistry is like a jealous, proud mistress. She demands years of devotion and constant attention of her admirers before she reveals her secrets and bestows her favors*." [2]. These persistent misconceptions may be linked to the unique

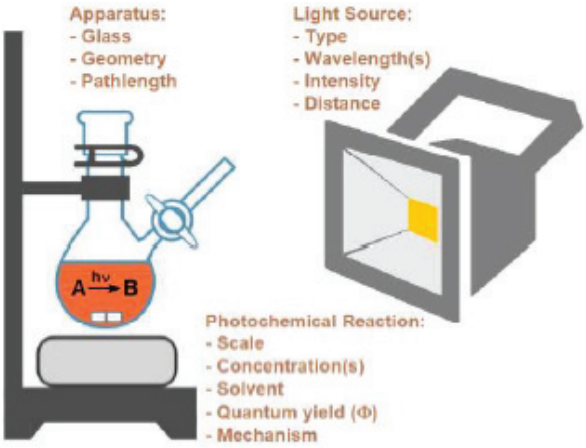

Figure 1. Representative photochemical setup and key-parameters.

experimental requirements of photochemical reactions (reagents, solvents and equipment) and the unconventional underlying photophysical processes involved. These are commonly insufficiently or poorly described in the scientific literature, contributing to the 'irreproducibility image' of synthetic photochemistry.

Although several experimental guidelines for conducting photochemical reactions have been developed in the past [3], these have not found widespread implementation in the synthetic community. The need for standardization and mandatory experimental reporting requirements has also been recently expressed by the pharmaceutical industry: "*The critical process understanding on the effect of the light intensity, internal reaction temperature, substrate concentration and reactor geometry is absent, and this is inconsistent with any other area of chemistry when reporting or comparing chemical reactions*." [4]. Standardization of equipment and "rational reaction design" approaches have also been proposed for photocatalytic transformations [5,6], where improvised "home-made" irradiation devices and protocols have been especially widespread.

The IUPAC project 'Synpho' intends to collect topical experimental procedures in the field of preparative photochemistry with emphases on essential experimental and mechanistic details (Figure 1). This collection may become a standard for every new report on synthetic photochemistry, thus guaranteeing a maximum of reproducibility and mechanistic understanding. To achieve this, SynPho will gather a large assortment of photochemical reactions and useful synthetic methods that utilize light- initiated and/or light-driven (*i.e.* photon catalytic or stoichiometric) processes. These will include descriptions of reactor setups (geometries, optics, materials, lamps, filters, wavelengths) and photon-specific information (quantum yields, quantum efficiencies, absorption and emission properties of substrates, intermediates and products).

Initially, SynPho aims to publish 100 examples in a highly condensed (concerning methods and techniques) but also comprehensive (concerning the different photochemical reaction types) collection for *Pure and Applied Chemistry*. This will be complemented by an index summarizing relevant information on:

- Reaction type, general process;
- Compound(s) that is (are) electronically excited;
- Excitation mode (direct, sensitized, mediated);
- UV-vis properties of the chromophore(s), absorption and emission;
- Excitation wavelengths and excitation sources used (lamps, filters, optics);
- Irradiation conditions (photoreactor, geometries, pathlengths, light intensity);
- Irradiation time;
- Monitoring parameters (reaction progress determination);
- Quantum yield information (actinometry, direct determination);
- Mechanistic proposal (how the reaction proceeds);
- Workup, product isolation and characterization.

It is envisaged that SynPho will ultimately become a Standard of Good Practice for conducting photochemical reactions, both for publishing (as a guidebook for scientific editors and referees) as well as for conducting these experiments (as a guidebook for experimentalists).

The SynPho-project is directed by two established researchers in Germany (Axel Griesbeck, University of Cologne) and Australia (Michael Oelgemöller, James Cook University). Both academic researchers and their groups have longstanding experiences in synthetic organic, mechanistic, technical and applied photochemistry [7,8]. The project is supported by IUPAC and is hosted by its photochemistry subcommittee as part of Division III. In recent years, several projects were conducted and finalized by publications in *Pure and Applied Chemistry* as glossaries [9,10], technical reports [11-13] or recommendations, *e.g.* by the former chair of this subcommittee, Silvia Braslavsky [14].

Selected researchers and fellow colleagues have already been invited to contribute to SynPho in order to collect representative 'reaction highlights. However,

any active researchers in the preparative photochemistry community should feel encouraged to pitch their showcase procedure(s) with supporting literature reference(s). All contributors will become co-authors of the final *Pure and Applied Chemistry* compilation.

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14. Professor Braslavsky is the first recipient of the European Photochemistry Association (EPA) Award for Service to the Photochemical Community in 2020.

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Feature Articles Wanted

Contact the editor for more information at <edit.ci@iupac.org>.