

Towards an Open Database of Optical and Thermal Radiative Data

Jon Gabirondo-López^{1, S, C}, Mireia Sainz-Menchón¹, Iñigo González de Arrieta¹, Telmo Echániz², Gabriel A. López¹, Iñigo Arredondo³ and Josu M. Igartua¹

¹*Physics, University of the Basque Country UPV/EHU, Leioa, Bizkaia, Spain*

²*Applied Mathematics, University of the Basque Country UPV/EHU, Bilbao, Bizkaia, Spain*

³*Electricity and Electronics, University of the Basque Country UPV/EHU, Leioa, Bizkaia, Spain*
jon.gabirondol@ehu.eus

Open Science is a scientific movement that focuses on the openness, transparency, and reproducibility of the reported results. Such movement requires that the scientific community adopts good reporting practices so that data is shared according to the FAIR (Findability, Accessibility, Interoperability, and Reuse) guidelines, and following the Open Data standard. In order to do that, it is necessary to develop open standards that ensure the reusability of published data, and open repositories that make available that data in an identifiable and accessible manner. Unfortunately, within the context of thermophysical properties, no standard file format has been established to report optical and thermal radiative properties, and the availability of unified digital data is anecdotal.

We present a new open framework and an open database of optical and thermal radiative properties: emissivity, reflectivity, absorptivity, transmittance, dielectric function, and refractive index. On the one hand, the framework is aimed to ensure the reproducibility of experimental data and follows the aforementioned standards. It can be used in any experimental setup that produces a small- or medium-sized data. On the other hand, the database uses the file format defined in the framework to store experimental results, and it can be accessed through a web application. The data shown in the database is identified by its publication metadata, and it can be explored interactively. All data (raw and processed), metadata, and scripts published at the web application are available to download. Thus, reported data is properly identified, and it can be reused freely. This application facilitates inter-comparisons between research teams, measuring methods and uncertainty budgets, and provides the industry with high-accuracy digital data.

In the near future, the development of the database will help ensure the reproducibility of results and increase the transparency in the scientific process, further strengthening the credibility and reliability of thermophysical research.