

Matter's Art and Art's Matter

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The study of Materials Science, which is the base for the Materials Engineering and allows to implement the practical activities of fabrication, forming, functionalization, aesthetics preparation and maintenance of all appliances, devices and equipment utilized by humankind, is essentially based on the comprehension of Nature's symmetry. To understand the materials it is necessary to deeply observe and analyze their internal content, to unveil their inner constitution by means of the microstructural species. The technic-scientific evaluation of materials' microstructure enables understanding and designing their properties, which defines the Engineering performance of components, making them suitable for practical use by the society. Such metallographic characterization creates scientific and technologic valued material, but also, frequently, possesses attractive figurative aesthetic. This allows cogitating if the result of the metallographic analysis could also be considered a piece of art. Normally, this is not the way the metallographic analysis is evaluated, since it is made with technical and scientific objectives. However, it should be considered that the person who obtains a micrographic image uses his/her own discretion to choose the best framing that will show the microstructural species therein present. Similarly as they are explored and arranged in such a way to emphasize the technical aspect searched, they may also be presented in an aesthetically interesting configuration. For such, the person's state of spirit and emotions will contribute for the choice made and, as such, he/she will act as an artist, who discharges his/her feelings in a painting, sculpture or other forms of art. The result of the micrographic work will also be considered then as artistic and will unveil matter's art, in addition to the technical characterization.

Several artistic expressions make use of materials to be accomplished. The fabrication of all kinds of sculpture, painting and plastic arts, in general, make use of materials. They are considered pieces of art because they carry with them the emotions and the environmental contextualization of human beings. However, these art pieces may have the materials that constitute them analyzed under the point of view of their microconstituents to characterize and disclose the matter's art. This was the context associated with the exposition Interfaces and Frontiers: Science and Art (<http://www.labh2.coppe.ufrj.br/expo.php>). It was conceived by the Hydrogen Laboratory, LabH2, at Coppe, graduate institute on Engineering at the Federal University of Rio de Janeiro, UFRJ, and executed by LabH2 with the support of UFRJ's House of Science and School of Fine Arts on the second semester of 2014 to commemorate LabH2's thirty years of existence and Coppe's fifty years anniversary. The exposition has made homage to the sculptor Maurício Salgueiro, by utilizing a replica of one of his masterpieces, the Little Balls Cup. The observation and analysis of the microstructural species contained in a material used in an artistic sculpture such as the Little Balls Cup, art's matter, served to evaluate its properties, but also to unveil matter's intrinsic art. In such case, color graded distinguished geometrical forms were shown, emphasizing compounds and interfaces in different magnification scales, from the macroscopic one, with visual observation, passing through microscopic and nanoscopic analyses to reach the atomic scale, presenting organized crystalline organization. A tunnel immersed the visiting person in black-and-white micrographs obtained by electron microscopies, as well as colored ones, obtained by optical microscopy with special attacks for that purpose. Multimedia devices helped to understand the content and to explore all the spectrum of metallographic analyses presented.

Engineering and Materials Science was, that way, thoroughly exhibited from analyses of content and aesthetics, that brought inquiries and observations such as:

- Can art's matter, itself, be considered an art piece when its scientific metallographic analysis includes the microscope operator emotions in the way it is represented?
- How far do frontiers go to define interfaces between science and art?
- Are science and art elements of an effective combination for stimulating innovation?

- May science evidence directly a non-intentional art or to be considered art the singular emotional human contribution should be present?
- Sometimes, pioneer scientists challenge the status-quo with more intuition than with deductive logics, such as an artist that creates enchantment by intuitively expressing feelings and emotions in an art piece;
- Science searches explanations and justifications for the natural phenomena, but art does not explain the beauty, because it exists merely in the mind of whoever contemplates it;
- Science images, such as the metallographic ones, show a singular artistic world, which immerses the observer in a varied experience of nature that is beyond normal perception;
- Science is based on hypothesis with specific objectives to be proved, while art is auto sufficient and has its own aim embedded in itself, without any other purposes;
- To use science and art as distinguished lenses to look at the world, is essential to design our future well-being;

The Materia journal invites each professional from this area to explore matter's art, unveiled by microstructure, and exhibit it in articles that discuss its scientific content.