Chem. Chem. Technol., 2017,
Vol. 11, No. 4

Events

NEW TEXTBOOK "MATERIALS: INTRODUCTION AND APPLICATIONS" BY WITOLD BROSTOW & HALEY E. HAGG LOBLAND, JOHN WILEY & SONS 2017

Michael Bratychak[1, *], Olena Shyshchak[1]

This book is different from all other textbooks of Materials Science and Engineering for several reasons. Prof. Ulf W. Gedde, The Royal Institute of Technology, Stockholm, writes in his Foreword: "MSE is based on real life and has to be connected to it repetitively – this is a very important feature of this textbook". He also says: "… several classes of materials have "equal rights …".

Indeed, there are classes of materials, properties and even a state of matter discussed by W. Brostow and H. Hagg Lobland that are not discussed in other textbooks. Here is a possibly incomplete list:

* glassy metals. While other MSE textbooks have much space devoted to metals, they talk about crystalline metals – known for thousands of years. Glassy metals have better mechanical properties and higher corrosion resistance than crystalline ones – but they are ignored by most other textbooks.

*petroleum, natural gas, coal, and other organic raw materials. There is a chapter on this class of materials. The fact that the petroleum industry has been created in Lviv by Ignacy Lukasiewicz, that Lviv was therefore the first city in the world with modern street lamps is noted. The fact that the first petroleum refinery in the world was created in Drohobych and is still in operation is noted also. This while other textbooks of MSE do not even have the words "petroleum" or "oil" in their subject indexes.

* quasi-crystals discovered by Daniel Shechtman (Nobel prize in Chemistry 2011) are discussed in this textbook but not in any other one.

* smart materials, including liquid crystals, there is a chapter on this class of materials. If discussed at all in other MSE textbooks, there is less than one page devoted to them.

* there is a chapter on surface behavior and tribology, which includes friction, scratch resistance, wear, also dry oxidation and corrosion – treated from a common point of view. This is important since annual economic losses of industry because of wear of moving parts are larger than the losses due to corrosion. Other MSE textbooks do not even have words "wear", "friction" or "scratch resistance" in their subject indexes.

* plasma – the fourth state of matter – ignored in other textbooks.

* there is a chapter on thermodynamics which explains the Zeroth, First and Second Law, no need for the Third Law, also the concept of Negative Temperatures. Thermodynamic potentials are explained, including the Landau potential so named after Lev Landau of Harkiv, a Nobel laureate in Physics. There is also a separate chapter on thermodynamics properties such as thermal conductivity and thermal expansivity.

* there is a chapter on structures of crystals and another one on structures on non-crystals. The most important in the latter are the Voronoi polyhedra – so named after Hrihory Voronoi born in Zhuravka near Kyiv. Other textbooks have a chapter on crystal structures, sometimes also a chapter on crystal defects, but no chapters on non-crystals. Non-crystal structures are discussed in other MSE textbooks on one page, if at all.

* a chapter on biomaterials – compared with one paragraph or nothing in other textbooks.

* a chapter on materials testing and standards also absent in other textbooks.

The textbook under review pays clearly more attention to science and engineering originating in Ukraine than other textbooks. This pertains not only to textbooks of Materials Science and Engineering. The examples named above are not the only ones. Each chapter has a motto. Thus, the motto of Chapter 1 is the inscription on the Library building of Lviv Polytechnic National University.

[1] Lviv Polytechnic National University
12, S.Bandery St., 79013 Lviv, Ukraine
[*] *mbratychak@gmail.com*