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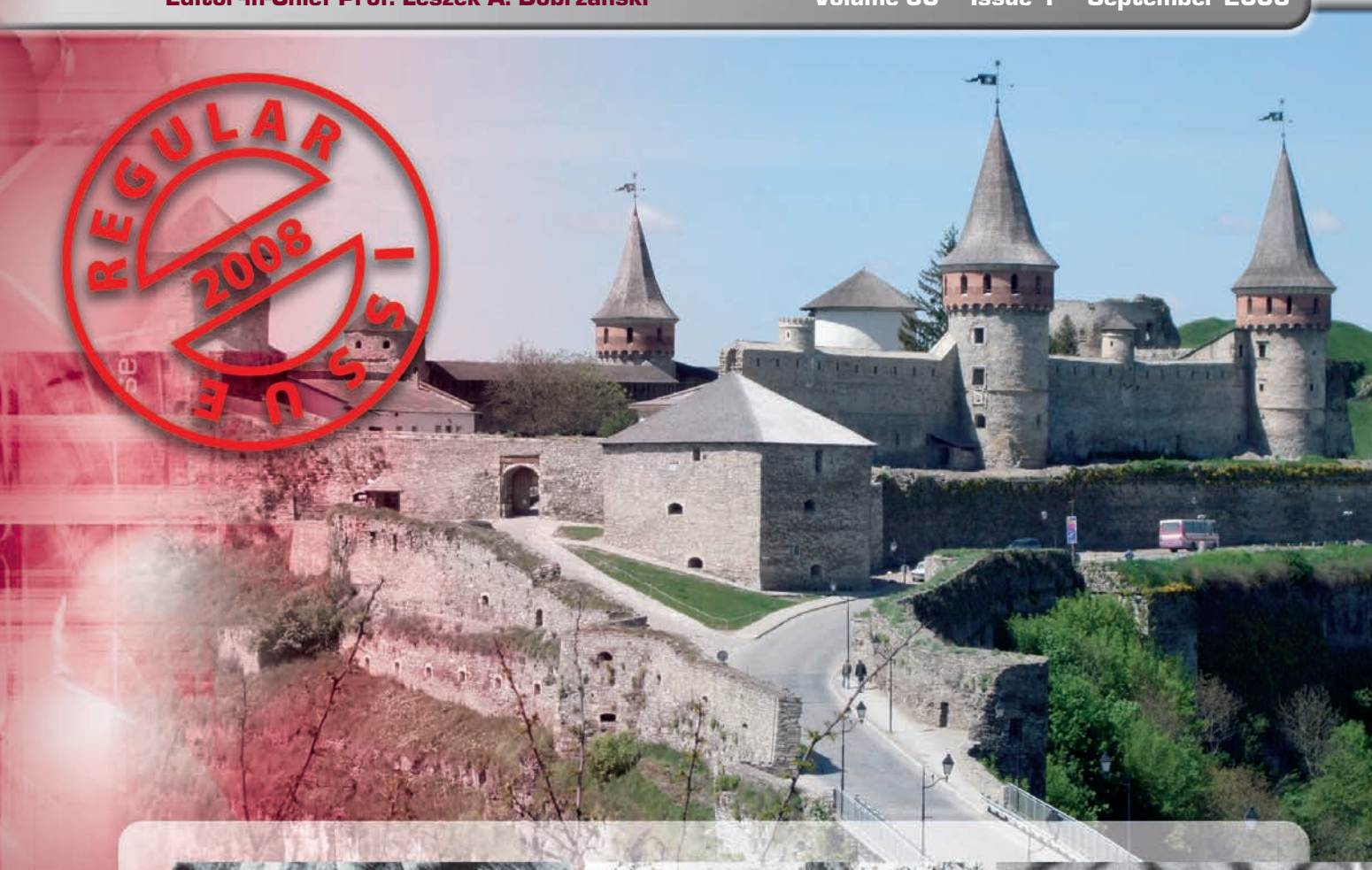

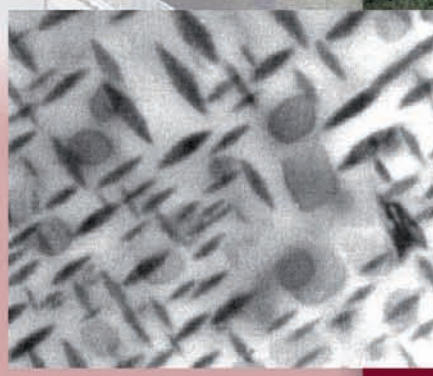

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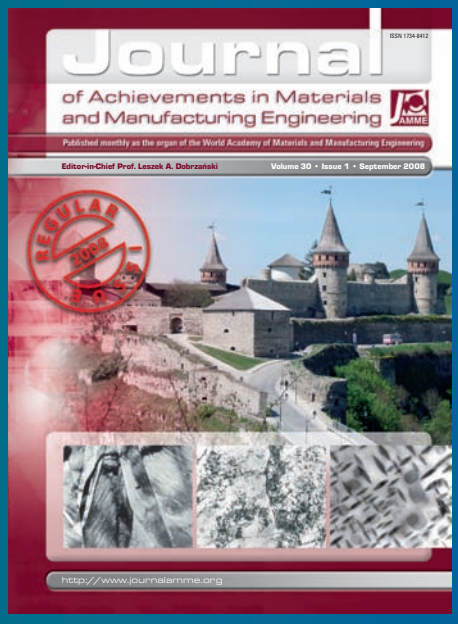
Cover story



The 6th International Conference of Young Scientists on "Computer Science and Mechanics" under the patronage of the World Academy of Materials and Manufacturing Engineering took place in Kamieniec Podolski, Ukraine in May 2008. The photo of the fortress in Kamieniec Podolski on the territory of contemporary Ukraine, as the excellent example of the Medieaeval fortification architecture is shown on the cover. Analogies were observed between the role of such constructions in strengthening of positions of States and mechanisms of strengthening the engineering materials to form the improved mechanical properties. Some strengthening mechanisms of the selected engineering materials observed in the transmission electron microscope are presented in small photos of thin foils presented on the cover. The first small photo of the Fe and 33% Ni alloy shows the lathe martensite as an example of possibilities demonstrating that refinement of structure of the polycrystalline materials (Hall-Petch rule) decides the significant improvement of the metal alloys mechanical properties due to series of the successive glides and twinnings. The second small photo of the Cr-Ni steel with the 18-10 type austenite matrix illustrates blocking the growth of grains recrystallizing dynamically during the hot plastic deformation by the relatively hard, undissolved dispersive phases, e.g., carbides in steels, and ensuring in this way the fine-grained structure. The third small photo of the Ni alloy with 13%Cr,6% Al,4%Mo, and 2% Nb additions as well as of other elements in small concentrations shows the precipitation hardening of the age hardened metals alloys, ensuring activation of the Orowan mechanism of blocking the dislocation glide during plastic deformation by the relatively hard and dispersive precipitations of phases, and therefore, resulting in the significant improvement of the mechanical properties of the material strengthened in this way. These are only some of the strengthening mechanisms of the selected engineering materials available in materials engineering for forming structure of the engineering materials.