Progress in Heterostructured Materials

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Strong and tough materials are desired for light-weight applications such as electric cars and aerospace applications. Recently, heterostructures are found to produce unprecedented strength and ductility that are considered impossible from our textbook knowledge and materials history [1]. Heterostructured materials consist of heterogeneous zones with dramatic (>100%) variations in mechanical and/or physical properties [2-4]. The interaction in these hetero-zones produces a synergistic effect where the integrated property exceeds the prediction by the rule-of-mixtures. Importantly, HS materials can be produced by current industrial facilities at large scale and low cost. There are many scientific issues with such materials that challenge the communities of experimental materials science and computational material mechanics. Heterostructured materials is quickly becoming a hot research field. In this talk I'll present the progress in heterostructured materials as well as future challenges and issues.

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4) 4. YT Zhu: Metall. Mater. Trans. A, 2021, vol. 52, pp. 4715-4726.