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High-entropy alloys (HEAs) are alloys that are formed by mixing equal or relatively large proportions of (usually) five or more elements. Prior to the synthesis of these substances, typical metal alloys comprised one or two major components with smaller amounts of other elements. For example, additional elements can be added to iron to improve its properties, thereby creating an iron based ...

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This paper reviews the recent research and development of high-entropy alloys (HEAs). HEAs are loosely defined as solid solution alloys that contain more than five principal elements in equal or near equal atomic percent (at.%). The concept of high entropy introduces a new path of developing advanced materials with unique properties, which cannot be achieved by the conventional micro-alloying ...

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Termed high-entropy alloys (HEAs), these new materials are formed by combining n elements of roughly equimolar concentrations. When n is large (typically $n \geq 5$), the high entropy of mixing can stabilize solid-solution-like phases with relatively simple crystal structures rather than forming the conventionally expected complex intermetallic ...

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High-entropy alloys are a class of materials that contain five or more elements in near-equiatomic proportions 1,2. Their unconventional compositions and chemical structures hold promise for ...

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Fig. 1 Improving the performance of thermoelectric materials and modules through entropy engineering. (A) Diagram of lattice distortion with increasing entropy. The pink, red, green, blue, and purple spheres represent Pb, Sn, Se, Te, and S atoms, respectively. (B) zT values as a function of temperature for the high-entropy n-type PbSe-based materials in this work.

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Metal alloys normally consist of one dominant element, with others in small amounts to improve specific properties. For example, stainless steel is primarily iron with nickel and chromium but may contain trace amounts of other elements. Gludovatz et al. explored the properties of a high-entropy alloy made from equal amounts of chromium, manganese, iron, cobalt, and nickel.

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In the general case of mixing non-ideal materials, however, the total final common volume may be different from the sum of the separate initial volumes, and there may occur transfer of work or heat, to or from the surroundings; also there may be a departure of the entropy of mixing from that of the corresponding ideal case. That departure is the main reason for interest in entropy of mixing ...

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Effects of mixing enthalpy and cooling rate on phase formation of Al_xCoCrCuFeNi high-entropy alloys. Materialia. 6. Zhang X, Guo S, Liu P, Li Q, Xu S, Liu Y, Jiang K, He P, Chen M, Wang P, Zhou H (2019). Capturing Reversible Cation Migration in Layered Structure Materials for Na-Ion Batteries. Advanced Energy Materials. 9(20). Liu P, Wang L, Yue Y, Song S, Wang X, Reddy KM, Liao X, Zhang Z ...

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The invigorated level of effort in investigating this class of materials can be traced back to the original work of Bogdanovic 9 when he discovered that Ti-mediated dehydrogenation could be effected in NaAlH₄, prior to melting. 10 As with a number of complex hydride dehydrogenation reactions, however, the actual reaction pathway and diffusion mechanism seldom consists of a simple route where ...

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[15] M. T. Agne, G.J. Snyder, et al "Heat Capacity of Mg₂Sb₂, Mg₂Bi₂, and their alloys at high temperature" *Materials Today Physics* 6, 83 (2018) [16] Riley Hanus, G. J. Snyder et al "Lattice Softening Significantly Reduces Thermal Conductivity and Leads to High Thermoelectric Efficiency" *Advanced Materials*