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Richard D. James* (james@umn.edu), Aerospace Engineering and Mechanics, 107 Akerman Hall, University of Minnesota, Minneapolis, MN 55455. *New materials from mathematics, real and imagined*. Preliminary report.

In this talk I will give some examples of materials whose recent discovery was based in an essential way on mathematical ideas. These ideas link concepts from calculus of variations, pde, group theory and the mathematical theory of origami. Some of these materials have the ability to change heat directly into electricity, without the need of a separate electrical generator. Stepping back, I present thoughts on how to search in a systematic way for broad classes of interesting, yet undiscovered, materials. (Received July 27, 2017)