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# Architected Materials: 15 Years of Progress, and Emerging Challenges

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## **Architected materials : 15 years of progress, and emerging challenges**

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Since the original paper ( Ashby, M.F. and Brechet, Y. (2003) “Designing Hybrid Materials” Acta Materialia Vol 51, 5647 – 6019) the concept of architected materials has proven to be a useful tool to develop multifunctional association of materials with a prescribed geometry, in order to “fill the gap” in materials space. Although, as in many case, the concept came well after the practice ( people were doing architecture materials without knowing) , it has contributed to blurr the frontier between functional and structural materials, and to soften the barrier between materials and components. Since the seminal paper, a number of bridges have been created with topological optimization, discrete optimization methods and bio-inspiration. These new routes have opened to materials scientist new strategies to improve materials efficiency with respect to complex requirements. Pending issues such as processing or recycling have to be addressed more systematically in order for the topic to find its full application in design , but a number of advanced applications in various fields will illustrate the progress made in the last 15 years and will propose some challenges to the community for the coming decade.