Description of the transformation toughening behavior of a static crack along an interface between a shape memory alloy and an elastic material

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The final aim is to describe the transformation toughening behavior of a static crack along an interface between a shape memory alloy and an elastic material . One determines the initiation (ending) phase transformation yield surfaces in terms of local phase angle, introduced by Rice et al[1] .In this proposal we give the general framework to determine this angle for a model integrating the assymmetry between tension and compression for shape memory alloys [2](experimentally measured by Vacher and Lexcellent [3] and Orgéas and Favier [4]) . We demonstrate the local phase angle existence in an appropriate framing domain and gives a sufficient hypothesis for its uniqueness and an algorithm to obtain it . Estimates are obtained in terms of physical quantities such as the Young modulus ratio , the bimaterial Poisson modulus values and also the choice of the yield loading functions . Finally , we illustrate this theoretical study by an application linking the assymetry intensity on the shape and the width and the shape on predicted phase transformation surfaces and by a comparison with the symmetric case (between tension and compression) .

Bibliography

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