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# Coupled problems at dissipative microstructures: Modelling and computational homogenization via the Virtual Element Method

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The Virtual Element Method (VEM) was introduced in its basic representation in [1] and [2]. The ability of treating elements with arbitrary number of nodes and possible non-convex shapes renders VEM as a suitable tool to discretize heterogeneous microstructures with regards to mesh flexibility. While FE-meshes might need a partial refinement to restore accuracy, VEM proved higher accuracy at the same number of degrees of freedom when compared to finite element solutions for coupled reversible problems at polycrystalline microstructures [3] and also for dissipative crystal-plasticity frameworks in [4]. In this contribution, a multi-physics coupled problem, incorporating also dissipative effects in a microstructural environment, is presented. It illustrates the advantage of using VEM in such heterogeneous geometric environments with regards to modelling and computational homogenization. Representative numerical examples will demonstrate the superior performance of VEM in terms of accuracy and robustness, compared to classic finite element approaches when quantities of interest are of effective nature.

## REFERENCES

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