

## **Variational principles for a theoretical model with coupled diffusion and mechanics**

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### **Summary**

In this paper chemical potential is introduced to describe the metal oxidation reaction. As an innovation, concentration diffusion is firstly considered to spread in a wave ways called non-fick diffusion in high temperature. Furthermore, to make concentration diffusion equation satisfy the typical Fick's law in form, inertia chemical potential is proposed. Then the several kinds of variational principles for coupled diffusion and mechanics are established and its corresponding governing equations and boundary conditions are naturally presented from their variational principle, respectively.

