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**Fracture of a finite piezoelectric layer with a penny-shaped crack.** (English) Zbl 1306.74054  
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**Summary:** This paper studies a penny-shaped crack in a finite thickness piezoelectric material layer. The piezoelectric medium is subjected to a thermal flux on its top and bottom surfaces. Both thermally insulated crack and heated crack are considered. Numerical solution for the finite layer thickness is obtained through the solution of a pair of dual integral equations. The result reduces to the closed form solution when the thickness of the piezoelectric layer becomes infinite. Exact expressions for the stress and electric displacement at the crack border are given as a function of the stress intensity factor, which is determined by the applied thermal flux. This paper is useful for the reliability design of piezoelectric materials in thermal environments.

**MSC:**

[74R10](#) Brittle fracture  
[74F15](#) Electromagnetic effects in solid mechanics  
[74F05](#) Thermal effects in solid mechanics

Cited in 6 Documents

**Keywords:**

[piezoelectric materials](#); [fracture mechanics](#); [thermal stresses](#); [penny-shaped crack](#)

**Full Text:** [DOI](#)

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