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Thermally Coupled Constitutive Relations of Thermoelastic Materials and Determination of Their Material Constants Based on Digital Image Correlation with a Laser Engraved Speckle Pattern

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Highlights

- New thermally coupled constitutive relations are theoretically obtained.
- A high temperature measuring system is designed.
- A novel laser engraving technique is used in high temperature testing.
- Digital image correlation method is used to obtain mechanical properties.
- Material constants are determined using experimental results.
- Mechanical properties are obtained as a function of temperature.
- Theoretical deformations are in good agreement with experimental results.

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