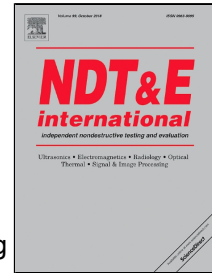


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Defect diagnosis for polymeric **samples** via magnetic levitation

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ABSTRACT

This paper discusses a non-destructive diagnostic method for polymeric **samples** using magnetic levitation and presents a novel mathematical model to investigate the relevant defect parameters. Magnetic levitation device has two anti-aligned magnets with like poles facing each other and a container of paramagnetic medium in which the polymeric **sample** is suspended. The principle of minimum potential energy and the Lagrange multiplier approach are employed to study the interaction between the equilibrium **inclination** and the internal defect. Through theoretical analysis, defective **samples** can be identified by the variation of their equilibrium **inclinations** in different paramagnetic media. The volume and location of the internal defect can be obtained by the levitation height and equilibrium **inclination**. To verify the accuracy of the proposed model, **intact samples** and defective **samples** with different shapes were investigated as examples. The results illustrate that the proposed method has broad application in material science and non-destructive testing.

Keywords

Magnetic levitation; Polymeric **sample**; Defect diagnosis; Mathematical model; Internal defect

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