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A phase-pegistration acoustic method for nondestructive testing of porous materials

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The well-known method of complex vibrator is modified for the purpose of measurements of complex elastic moduli (Young's and shear moduli) and corresponding values of internal friction, that change under the influence of different external factors. These external factors are: mechanical uniaxial compressive or tension stresses, temperature, electric and/or magnetic fields, etc. Different variants of phase-control methods in the self-excitation system of the complex vibrator are considered depending on the connection of the active piezoelectric bars: active external control or adaptive self-control at prescribed level of the input excitation level. The system contains the recording device to record quick changes of elastic and unelastic parameters of the test specimen. The system also contains the thermostatic switch with the active control device to provide the specimen temperature control at prescribed algorithm. The method is used for the nondestructive testing of the acoustic properties of different materials under the influence of the stepwise applied mechanical stress.