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**Enhancement in mechanical quality factors of poly phenylene sulfide under
high-amplitude ultrasonic vibration through thermal annealing**

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Highlights

1. A method for measuring mechanical quality factors (Q factors) in high-amplitude longitudinal vibrations is developed on the basis of the original definition of Q factors.
2. With increasing frequency and strain, the Q factors of PPS in high-amplitude longitudinal vibrations become lower.
3. It is an effective method to enhance the Q factors of PPS via thermal annealing when the heating temperature exceeds its glass transition temperature.

Abstract—Our previous study shows that poly phenylene sulfide (PPS) provides relatively high mechanical quality factors (Q factors) at ultrasonic frequency compared to other commonly-used functional polymers, and has potential as the vibrating body of a functional ultrasonic transducer.

Since PPS has semicrystalline frameworks, its Q factors may be enhanced through thermal annealing.

Prior to examining this feasibility, we developed a method for estimating Q factors under high-amplitude longitudinal vibration. Q factor is originally defined as the ratio of the reactive

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