Materials in everyday use are subjected to various conditions, temperature, humidity and more particularly mechanical vibration. Though rational designs have been made to withstand these environmental effects, materials still become weaker over time under cyclic loading. In nature, bone cells can adapt to cyclic loading via adding bone accordingly, a process called bone remodeling. This endows bone the ability to strengthen when subjected to stresses thereby preventing structural damage and improving the mechanical strength. Inspired by this, we have previously demonstrated the strengthening of material by ultrasound triggered polymerization and polymer crosslinking but lack adaptive nature to different loadings, particularly for the low frequency vibration (<20kHz) that material usually suffers. Herein, we describe a bone-remodeling-mimic strategy to harnessing low frequency vibration energy (500-5000Hz) and use for strengthening material. We used piezoelectric ZnO nanoparticle to mechanochemically initiate thiol-ene “click” reaction in an organogel system. The organogel can sense and adapt accordingly to the input vibrational energy, in terms of power, time and frequency, showing a maximum 60 times increase in modulus. Moreover, the degree of adaption can be monitored and self-reported to external electronics driven by its change in modulus. This integration of programmable feature enables the precise control of material’s property for a wide range of applications.