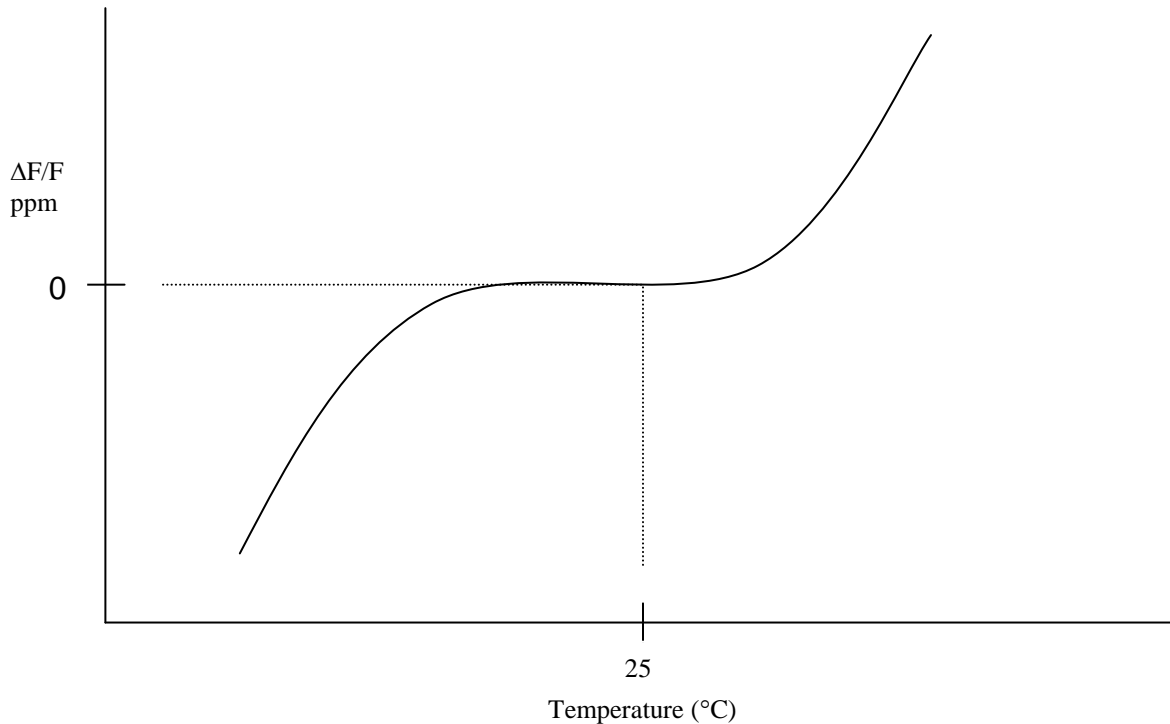


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Frequency-Temperature Behavior of AT-Cut Crystals



- In the vicinity of 25°C, the crystal resonance frequency is insensitive to temperature.
- As the crystal gets hotter (rising above 60-70°C), the temperature induced frequency shift becomes significant, on the order of 20 or more Hz increase in resonant frequency per degree rise. A 10 Hz shift for a material with a low density (e.g. aluminum) can correspond to a 5 Angstrom change in rate! (Note: The rate change is inversely related to temperature; a rise in temperature leads to a decrease in rate, and vice versa.)
- If the crystal is tightly held at the higher temperature ($\pm 1^{\circ}$), the effect can be ignored since the crystal will stabilize at the new frequency.
- Rapid heat cycling (e.g. quartz lamps turning on and off) will introduce rate spikes or superimpose continuously varying rate changes on the rate due to material deposition.