

Piezoelectric Effect

Piezoelectric materials can turn mechanical stress into electricity, and electricity into mechanical vibrations. Quartz is an example of a naturally occurring piezoelectric crystal. Quartz crystals are made of silicon and oxygen atoms in a repeating pattern. In quartz, the silicon atoms have a positive charge and oxygen atoms have a negative charge. Normally, when the crystal is not under any external stress, the charges are dispersed evenly in the molecules throughout the crystal. But when quartz is stretched or squeezed, the arrangement of the atoms changes slightly. This change causes negative charges to build up on one side and positive charges to build up on the opposite side. When you make a circuit that connects one end of the crystal to the other you can use this potential difference to produce current. The more you squeeze the crystal the stronger the electric current will be. Conversely, sending an electric current through the crystal changes its shape.

