



Piezoelectric Effect

Why in News?

Recently, scientists have reported evidence of the **Piezoelectric effect in liquids**.

- The effect has been known for 143 years and in this time has been observed only in solids.

What is the Piezoelectric Effect?

- The piezoelectric effect is a phenomenon in which **certain materials produce an electrical charge in response to mechanical stress or pressure**. This effect occurs when the material is subjected to a force that causes its molecules to become polarized, meaning that the positive and negative charges within the material are separated from each other.
- When this polarization occurs, an electric potential is generated across the material, and if the material is connected to a **circuit, a current can flow**.
 - The reverse is also true: if an electric potential is applied to the material, it can cause a mechanical deformation.
- Piezoelectric materials are **used in a variety of applications, such as in sensors, actuators, and energy harvesting devices**. Some examples of common piezoelectric materials include quartz, ceramics, and certain types of crystals.
 - Example: Quartz is the **most famous piezoelectric crystal**: it is used in this capacity in analog wristwatches and clocks.
 - The Piezoelectric effect was discovered in 1880, in quartz, by Jacques and Pierre Curie.

What are the Implications of Discovery?

- The discovery opens the door to applications that have previously not been accessible with solid-state materials and are more readily recyclable and in many instances pose **fewer environmental issues than many currently used piezoelectric materials**.
- The liquids also displayed the inverse piezoelectric effect: they became distorted when an electric charge was applied, this fact could **be used to control how the liquids bent light passing through them by passing different currents through them**.
 - That is, using this simple control mechanism, vials of these liquids could be lenses with dynamic focusing abilities.
- The new finding challenges the theory that describes this effect as well as opens the door to previously unanticipated applications in electronic and mechanical systems.

[Source: TH](#)