

Vibration Induced Waste-water Cleaning And Bacterial Disinfection Using Glass-ceramics Containing Piezoelectric

Application Number: 201911045685

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ABSTRACT

VIBRATION INDUCED WASTE-WATER CLEANING AND BACTERIAL DISINFECTION USING GLASS-CERAMICS CONTAINING PIEZOELECTRIC CRYSTALS [FIG. 1] as disclosed in present invention relates to glass ceramics containing piezoelectric crystals comprising of preferably, (LiNbO₃, LiTaO₃, NaNbO₃)-glass ceramics as materials for environmental applications such as removal of organic dyes and bacteria from the waste-water using vibration energy.

KEY APPLICATION AREAS

- 1.Wastewater treatment and water purification.
- 2.Industrial effluent treatment (textile and dye industries).
- 3.Bacterial disinfection of contaminated water.
- 4.Environmental pollution control.
- 5.Piezocatalytic materials for environmental remediation.
- 6.Advanced functional glass-ceramics for water treatment.

POTENTIAL USE

- 1.Removal of organic dyes (e.g., methylene blue) from industrial wastewater using vibration-induced piezocatalysis.
- 2.Bacterial disinfection of wastewater through reactive oxygen species (ROS) generated by piezoelectric glass-ceramics under ultrasonic vibration.
- 3.Real-time wastewater treatment systems for environmental safety and pollution control.
- 4.Large-area piezocatalytic panels for water treatment plants, rivers, lakes, and industrial effluent channels due to the material's scalability and chemical stability.

5. Chemical-free water purification, simultaneously degrading organic pollutants and disinfecting bacteria using vibration energy.