

TECHNOLOGY READINESS LEVEL: 5

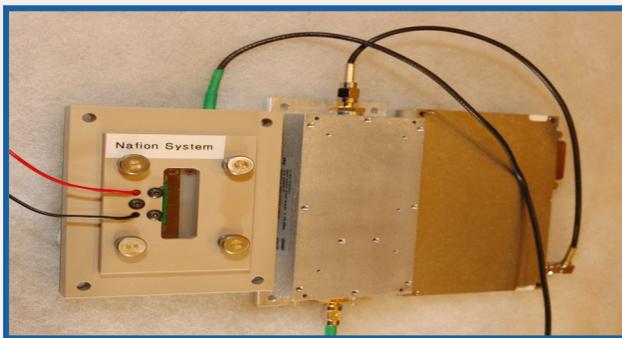
US PATENT PENDING

KEY ELEMENTS HAVE BEEN DEMONSTRATED IN RELEVANT ENVIRONMENTS

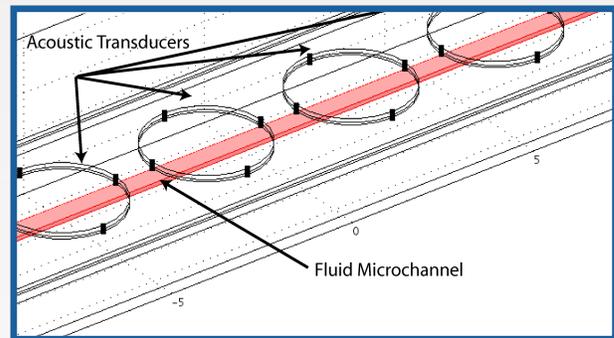
TECHNOLOGY SUMMARY

Extracting DNA from cells for testing and analysis can require the use of harsh chemicals, which means additional purification (up to several days) before amplification using PCR can be safely performed. Sandia researchers responded by developing a system for extracting and collecting DNA without chemicals, enabling rapid diagnosis applications.

This breakthrough acoustic streaming technology uses ultra high frequency (>50 MHz) sonic energy in a microchannel to burst cells and release DNA, making chemical treatment unnecessary and saving days of purification time. The in-line microfluidic processing recovers the nucleic acids for PCR amplification and type - testing with efficiency greater than 50%, making this solution attractive for high value, small volume samples, as well as field work. The cell lysis unit can also be used for amino acid recovery.



Complete microfluidic acoustic cell lysing and nucleic acid extraction system



A novel microchannel-based high frequency acoustic wave device uses sonic energy to quickly lyse cells and release nucleic acids

POTENTIAL APPLICATIONS

- Medicine: same-day pathogen diagnosis
- Species-specific drug prescriptions
- Lysing of resilient cells
- Security: bio-agent identification
- Rapid DNA evidence testing

TECHNOLOGICAL BENEFITS

- Short wavelength acoustic waves in a channel efficiently stress and break cells to release DNA
- No harsh chemicals; purification needed: PCR-ready DNA
- Efficient recovery (~50%) of DNA from tiny sample volumes

TECHNOLOGY INQUIRY?

For more information or licensing opportunities contact us at

ip@sandia.gov

Refer to SD #11592

or visit

<https://ip.sandia.gov>