[Acoustical Physics](https://link.springer.com/journal/11441" \o "Acoustical Physics)

July 2019, Volume 65, [Issue 4](https://link.springer.com/journal/11441/65/4/page/1), pp 444–449| [Cite as](https://link.springer.com/article/10.1134%2FS1063771019040109#citeas)

Acoustic Research Method for Burning Flammable Substances

Abstract

The effect of acoustic emission is used to study the acoustic radiation accompanying the combustion of flammable substances (alcohols, acetone, crude oil, and petroleum products), and experimental and calculated research results are presented. A set of time series and peak amplitude-frequency responses was formed that characterize the acoustic signals generated by these burning substances. The number of samplings recorded every 22 μs lies in the range of 1.5. × 106 up to 9.7 × 106. Fractal *R*/*S* analysis of time series demonstrates the fundamental possibility of identifying (recognizing) the nature of a burning substance. The dependence of the Hurst index *H* on the nature of a substance is established, and its numerical values are obtained.

Keywords:acoustic emission burning of fluids time series identification

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About this article

Levterov, A.A. Acoust. Phys. (2019) 65: 444. https://doi.org/10.1134/S1063771019040109

* **Publisher Name**Pleiades Publishing

* **Print ISSN**1063-7710

* **Online ISSN**1562-6865