

# Periodic Graphics

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To see more of Brunning's work, go to [compoundchem.com](http://compoundchem.com). To see all of C&EN's Periodic Graphics, visit [cenm.ag/periodicgraphics](http://cenm.ag/periodicgraphics).

A collaboration between C&EN and Andy Brunning, author of the popular graphics blog **Compound Interest**

## LAVA AND VOLCANIC GASES

Volcanic eruptions can be unpredictable and destructive. Here, we investigate the types of lava produced in volcanoes and the gases ejected during eruptions.

### TYPES OF LAVA

Lava is made up primarily of silicate minerals. Two main classifications of lava are mafic (or basaltic) lavas and felsic (or silicic) lavas. Some lavas are in between these two.

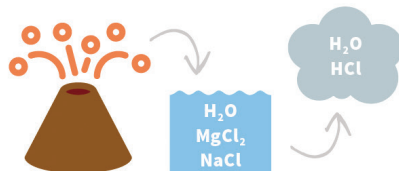
	MAFIC	FELSIC
<b>SiO<sub>2</sub> CONTENT</b>	<b>LOW</b> (~55% by mass)	<b>HIGH</b> (~70% by mass)

<b>ERUPTION TEMP. (°C)</b>	<b>HOTTER</b> (~1,100-1,200 °C)	<b>COOLER</b> (~700-800 °C)
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<b>VISCOSITY</b>	<b>LOW</b> (flows quickly)	<b>HIGH</b> (flows slowly)
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<b>GAS CONTENT</b>	<b>LOWER</b> (0.5-2.0%)	<b>HIGHER</b> (4.0-6.0%)
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If lava meets the sea, its high temperature creates clouds of steam and hydrochloric acid known as "laze." The acid forms from the reaction of steam with chloride salts.



### LAVA & PYROCLASTIC FLOWS

There are two main types of mafic lava flow common to Hawaiian volcanoes: pahoehoe and aa.

#### PAHOEHOE

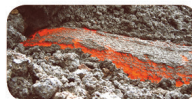


Smooth surface

Lower viscosity

Slow moving

#### AA



Rough surface

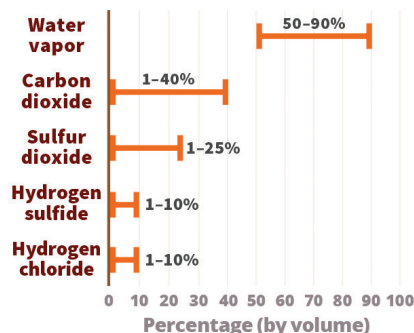
Higher viscosity

Fast moving

Highly explosive eruptions, like that of the Fuego volcano in Guatemala, yield pyroclastic flows. These are clouds of hot lava blocks, ash, pumice, and gas, with deadly high temperatures.

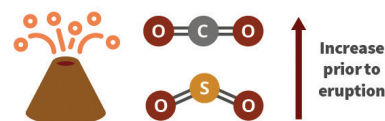
### VOLCANIC EMISSIONS

The composition of gases given off by volcanoes can vary depending on magma type and volcanic activity.



Source: "Advances in Global Change Research" 2004, DOI: 10.1007/978-1-4020-2167-1

Other gases found in lower amounts include carbon disulfide, carbonyl sulfide, and hydrogen fluoride.



Monitoring CO<sub>2</sub> and SO<sub>2</sub> emissions from volcanoes helps scientists predict if eruptions are imminent.