

Activity 2: Halogen Boiling Points

The table below displays the state of matter at 20°C and the boiling point of halogens – Group 17 elements. (Astatine, a radioactive element in Group 17, is not shown in this table.)

Element	State at 20°C	Boiling Point
Fluorine	Gas	-188°C
Chlorine	Gas	-35°C
Bromine	Liquid	59°C
Iodine	Solid	184°C

Use a Periodic Table and this data to answer the following questions.

Activity 3: Metal Halide Melting Points

Alkali metals are Group 1 metals. They form ionic compounds with halogens such as fluorine (F), chlorine (Cl), bromine (Br), and iodine (I). Such ionic compounds formed from a metal and a halogen are referred to as **metal halides**. Metal halides are solids at room temperature and have very high melting points. The Table shows the melting points of the various metal halides.

Lithium Halides

Alkali halide	Melting Point (°C)
LiF	845
LiCl	605
LiBr	550
LiI	449

Potassium Halides

Alkali halide	Melting Point (°C)
KF	858
KCl	770
KBr	734
KI	681

Sodium Halides

Alkali halide	Melting Point (°C)
NaF	993
NaCl	801
NaBr	747
NaI	661

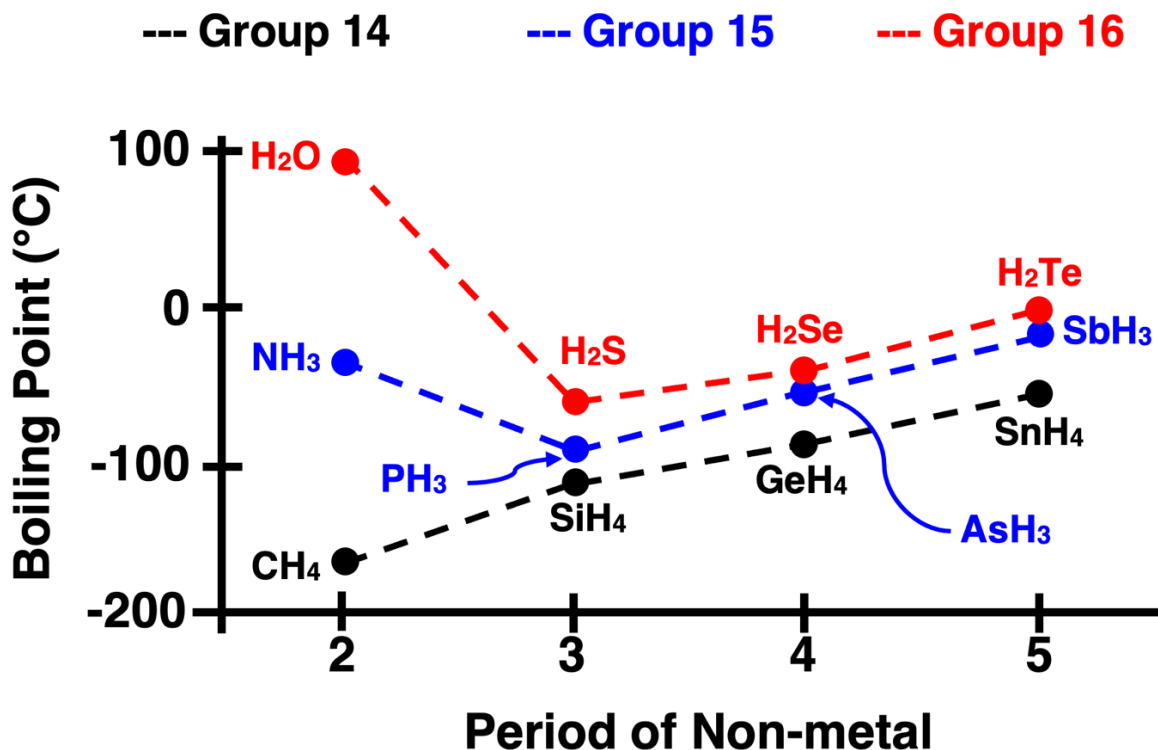
Rubidium Halides

Alkali halide	Melting Point (°C)
RbF	795
RbCl	718
RbBr	693
RbI	647

Analyze and use this data to answer the Activity 3 questions.

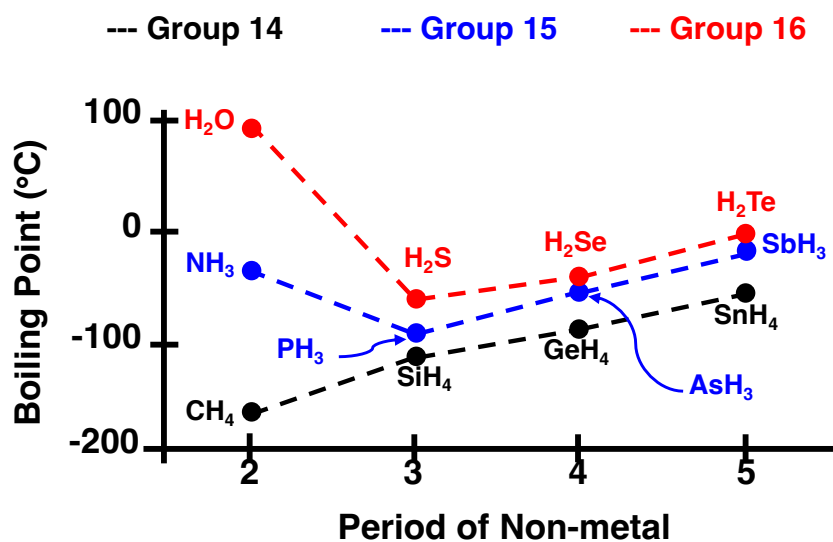
Activity 4: Boiling Points of Hydrides

Elements of the periodic table display trends in their properties. One trend is the boiling point value associated with molecular compounds containing hydrogen bonded to a non-metal or metalloid. Such compounds are referred to as **hydrides**. The plot displays the boiling points of such compounds for elements found in Groups 14, 15, and 16. Analyze the data in order to develop a model associated with boiling points and intermolecular forces (IMFs) for compounds containing hydrogen and a non-metal or metalloid.



Activity 5: Breaking the Trend

The Activity 4 Graphic demonstrated a clear trend for Group 14 hydrides. But the elements oxygen (O) and nitrogen (N) break the trend for Group 15 and Group 16 hydrides.



In Activity 5, we will look in more detail at trends, the underlying reasons for the trends, and the reasons the trends are broken by NH₃ and H₂O.