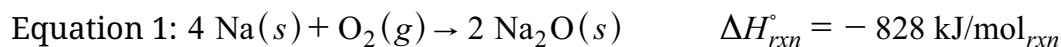


Question 7

The following information applies to parts A and B.

7. Sodium metal reacts with oxygen gas according to Equation 1.



Standard enthalpies of formation are provided in Table 1.

Table 1

Substance	ΔH_f° (kJ/mol)
Na (s)	0
O ₂ (g)	0
Na ₂ O (s)	?

Part A

Based on the information given, **calculate** the value of ΔH_f° for Na₂O (s). Show the work that leads to your answer.

Part B

An 18.4 g sample of Na (s) reacts with 12.8 g of O₂ (g) according to Equation 1. **Calculate** the total amount of heat, in kilojoules, released during this process. Show the work that leads to your answer.

Part C

Lattice enthalpy can be defined as the energy required to separate an ionic crystal into gaseous ions. Rb₂O (s) and Na₂O (s) have similar crystal structures, and their lattice enthalpies are given in Table 2.

Table 2

Compound	Lattice Enthalpy (kJ/mol)
Na ₂ O (s)	2481
Rb ₂ O (s)	2163

Using Coulomb's law, **explain** why the lattice enthalpy of Rb₂O (s) is smaller than that of Na₂O (s).

STOP
END OF EXAM