In many parts of the world, ethanol is now being used as an additive to reduce the amount of gasoline used for automobiles. Inside the engine, ethanol, C2H5OH, reacts with oxygen, O2, to produce carbon dioxide, CO2, water, H2O, and heat in the following reaction:

C2H5OH + 3O2(g) → 2CO2(g) + 3H2O(g) + 1364 kJ

A spark plug provides 368 kJ of energy per mole of ethanol, which is required to initiate the reaction.

Assume the enthalpy of the reactants is –235 kJ per mole of ethanol.

Draw a labeled potential energy graph for the combustion of 1 mole of ethanol.

Show the appropriate calculations to justify your answer.

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