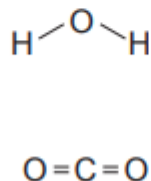
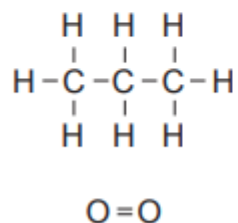


When propane, $C_3H_8(g)$, is burned, it reacts with oxygen, $O_2(g)$, in the air to form water, $H_2O(g)$, and carbon dioxide, $CO_2(g)$.



Calculate the average bond enthalpy of the C = O bond using the data below.



Bond	Average bond enthalpy/kJ mol ⁻¹
C - C	348
C - H	413
O = O	495
O - H	463

Bonds broken

2 x C-C	2 x 348
8 x C-H	8 x 413
5 x O=O	5 x 495
Total	6475

Bonds made

8 x O-H	8 x 463
6 x C=O	6X
TOTAL	3704 + 6X

$$\Delta_r H = \Sigma(\text{bonds broken}) - \Sigma(\text{bonds made})$$

$$\Delta_r H = 6475 - (3704 + 6X)$$

$$-2056 = 6475 - (3704 + 6X)$$

$$X =$$

