CLAIMS

1. A gas phase process comprising producing a carboxylic acid by contacting at a temperature of from 250°C to 400°C under halogen-free hydroxycarbonylation conditions an alkene, carbon monoxide gas, water and a solid metal sulfide catalyst.

2. The process of Claim 1 in which the catalyst comprises a Group VIII metal, other than Pd.

3. The process of Claim 2 in which the catalyst comprises at least one of iron, cobalt, nickel, rhodium and, ruthenium.

4. The process of Claim 3 in which the catalyst comprises at least one of cobalt, nickel, and, ruthenium.

5. The process of any of the preceding claims in which the alkene comprises at least one alkene selected from the group of (a) a monoolefinic alkene of the formula C_nH_{2n} in which n is from 2 to 12 and (b) a polyolefinic alkene, i.e., an alkene containing more than one double bond.

6. The process of any of the preceding claims wherein the process is continuous.

7. The process of any of the preceding claims in which the alkene is ethylene in the gas phase.

8. The process of any of the preceding claims in which the hydroxycarbonylation conditions include a pressure from 0.1 MPa to 10 MPa.

9. The process of any of the preceding claims conducted in a trickle-bed reactor.

10. The process of any of claims wherein the catalyst is supported.

11. The process of any of claims wherein the catalyst is cobalt sulfide.