A Highly Active Molybdenum Phosphide Catalyst for Methanol Synthesis from CO and CO$_2$

Methanol is a major fuel and chemical feedstock currently produced from syngas, a CO/CO$_2$/H$_2$ mixture. Herein we identify formate binding strength as a key parameter limiting the activity and stability of known catalysts for methanol synthesis in the presence of CO$_2$. We present a molybdenum phosphide catalyst for CO and CO$_2$ reduction to methanol, which through a weaker interaction with formate, can improve the activity and stability of methanol synthesis catalysts in a wide range of CO/CO$_2$/H$_2$ feeds.