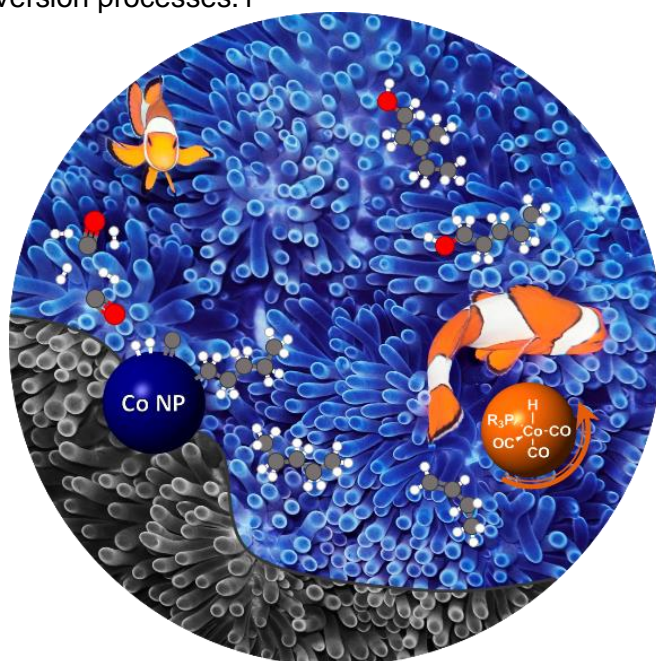


Combining Fischer Tropsch and Hydroformylation for long chain alcohols from Syngas

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Abstract

The selective conversion of syngas to higher alcohols is an attractive albeit elusive route in the quest for effective production of chemicals from alternative carbon resources. We report the tandem integration of solid cobalt Fischer–Tropsch and molecular hydroformylation catalysts in a one-pot slurry-phase process. Unprecedented selectivities (>50 wt%) to C₂ + alcohols are achieved at CO conversion levels >70 %, alongside negligible CO₂ side-production. The efficient overall transformation is enabled by catalyst engineering, bridging gaps in operation temperature and intrinsic selectivity which have classically precluded integration of these reactions in a single conversion step. Swift capture of 1-olefin Fischer–Tropsch primary products by the molecular hydroformylation catalyst, presumably within the pores of the solid catalyst is key for high alcohol selectivity. The results underscore that controlled cooperation between solid aggregate and soluble molecular metal catalysts, which pertain to traditionally dichotomic realms of heterogeneous and homogeneous catalysis, is a promising blueprint toward selective conversion processes.¹



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