Supported ionic liquid phase (SILP) technology was applied for the first time to the Pd-catalyzed continuous, gas-phase methoxycarbonylation of ethylene to selectively produce methyl propanoate (MP) in high yields. The influence of catalyst and reaction parameters such as, for example, ionic liquid loading, metal concentration, and ligand loadings was studied, and in particular the SILP catalyst activity and stability was found to be strongly dependent on the ligand to metal ratio.