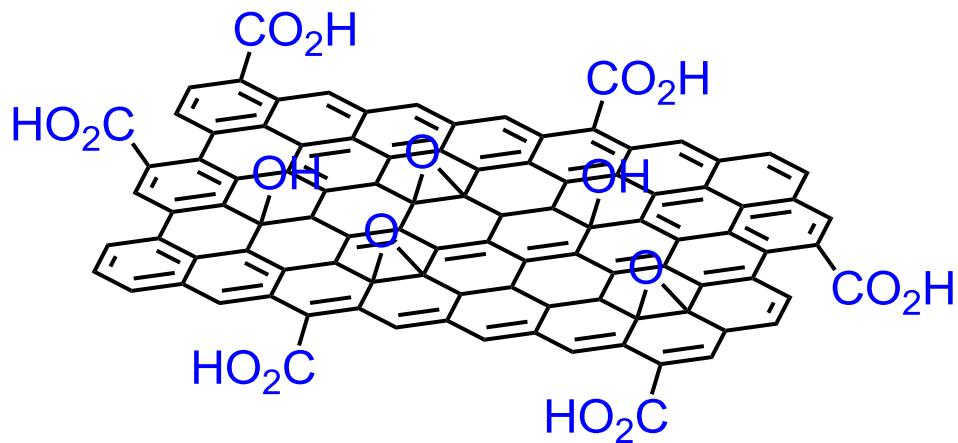
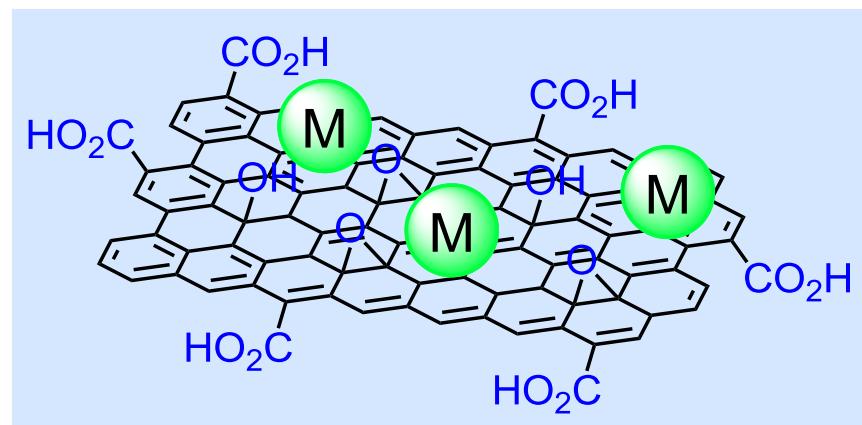
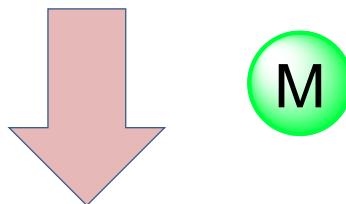


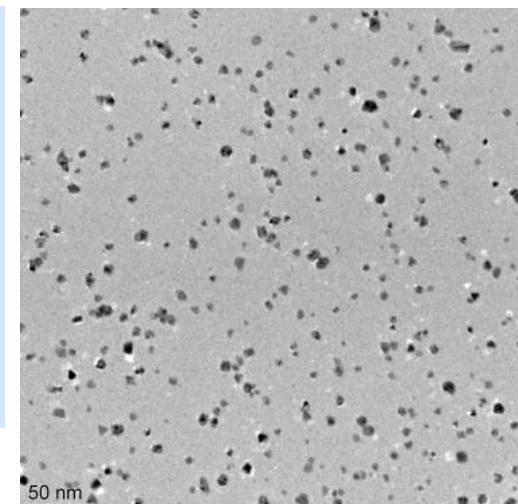
Metal-GO

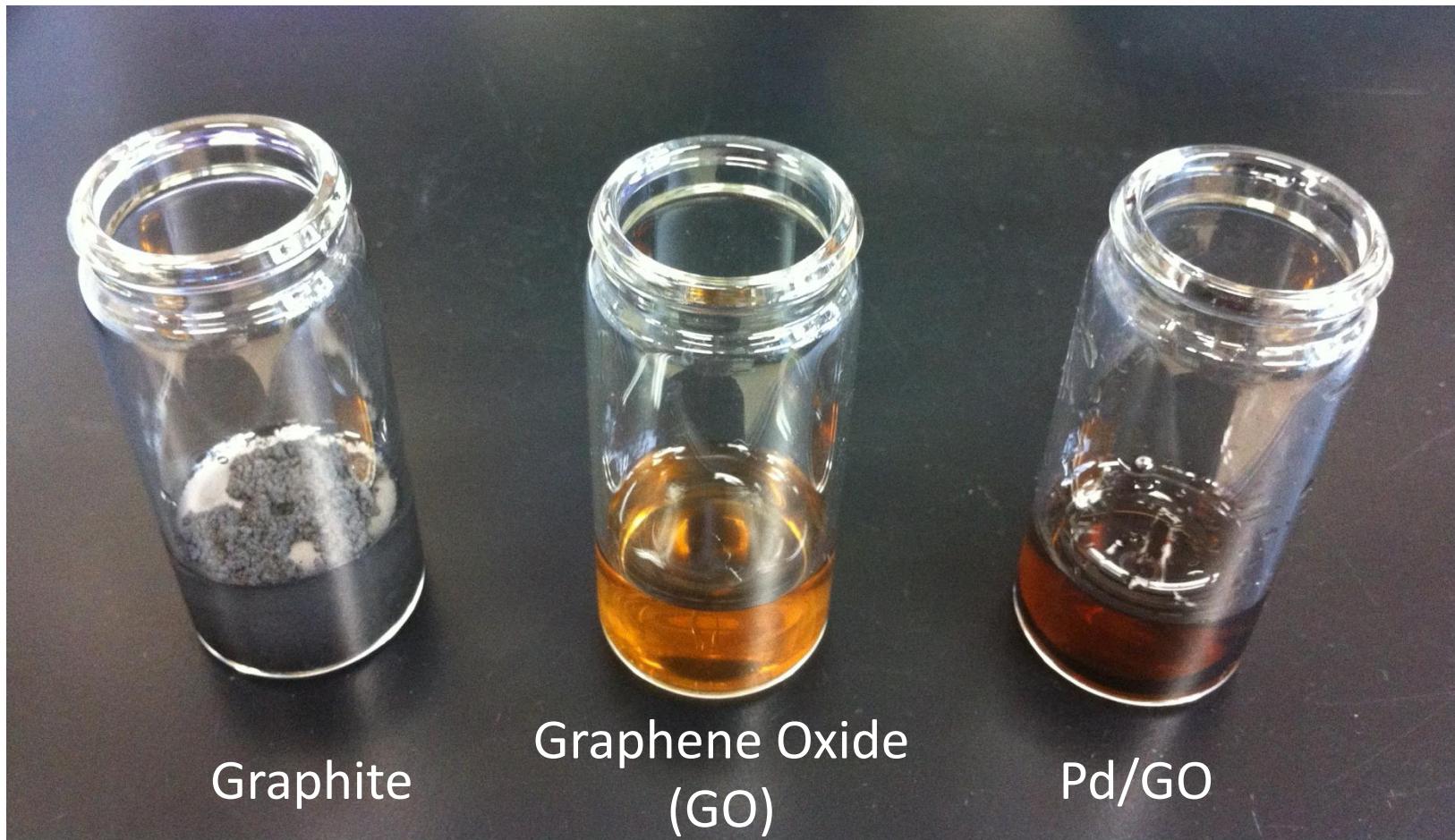


Graphene Oxide (GO)



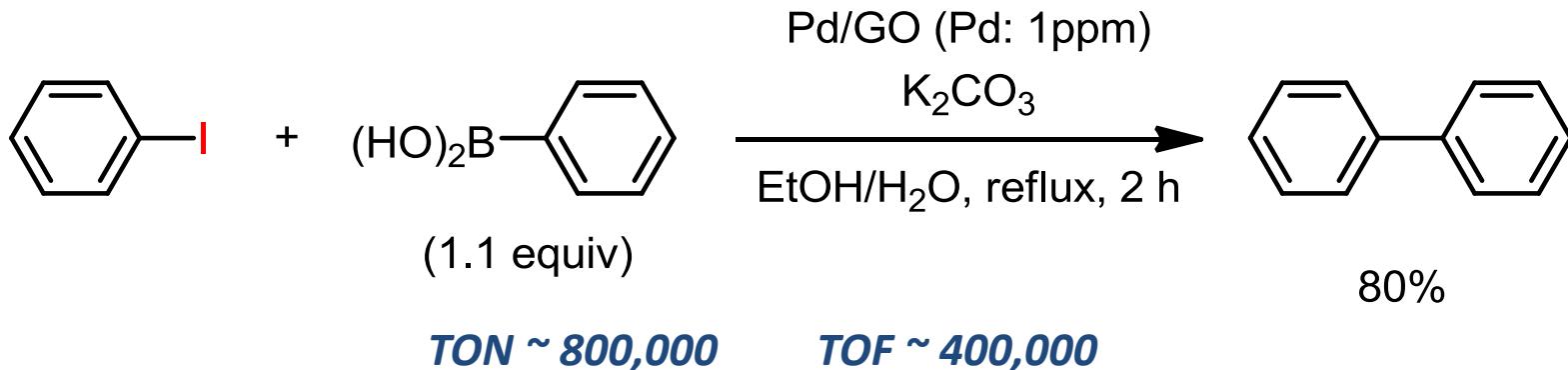
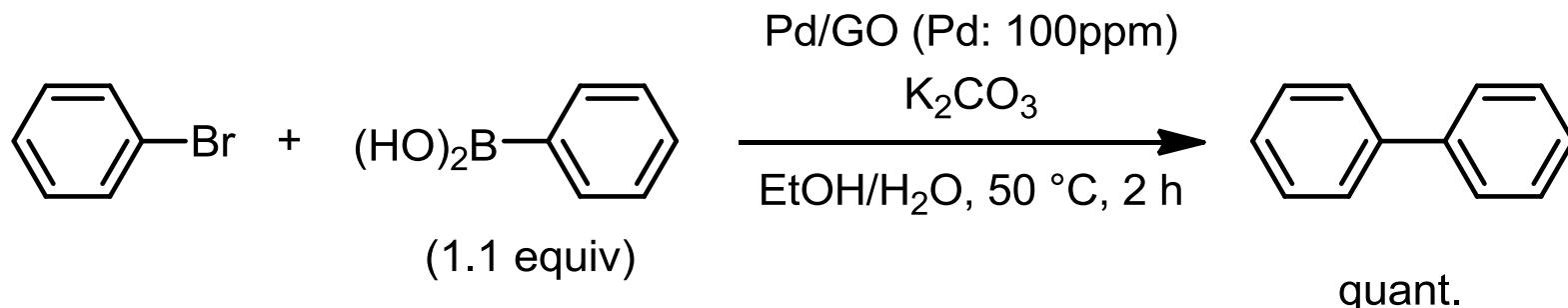
Metal-GO



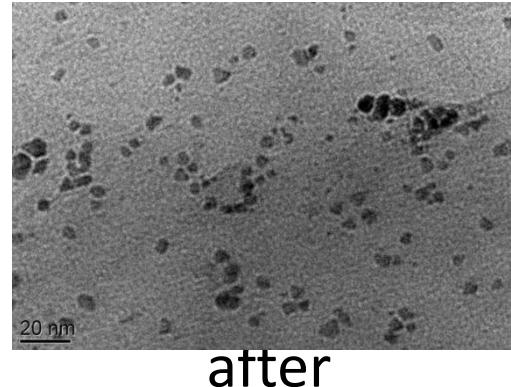
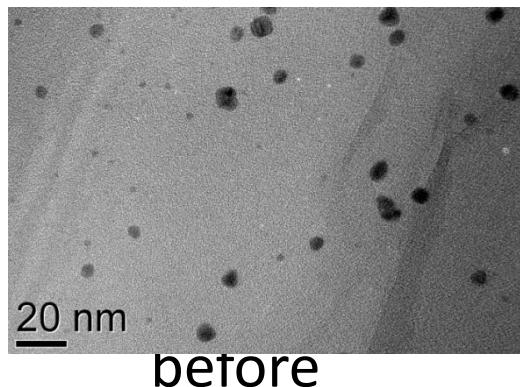


均一系触媒のように振る舞う不均一系Pd触媒

有機合成触媒としての利用

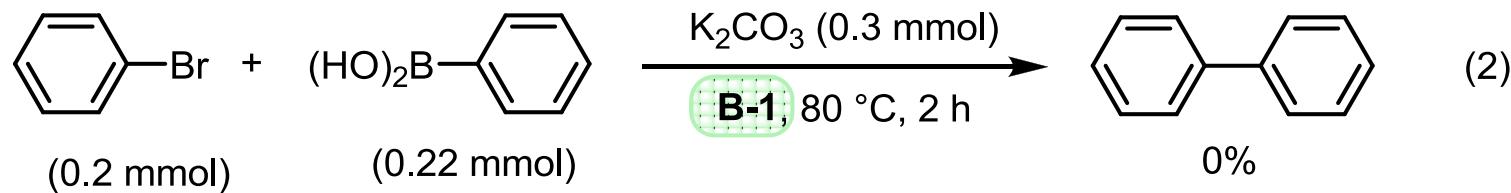
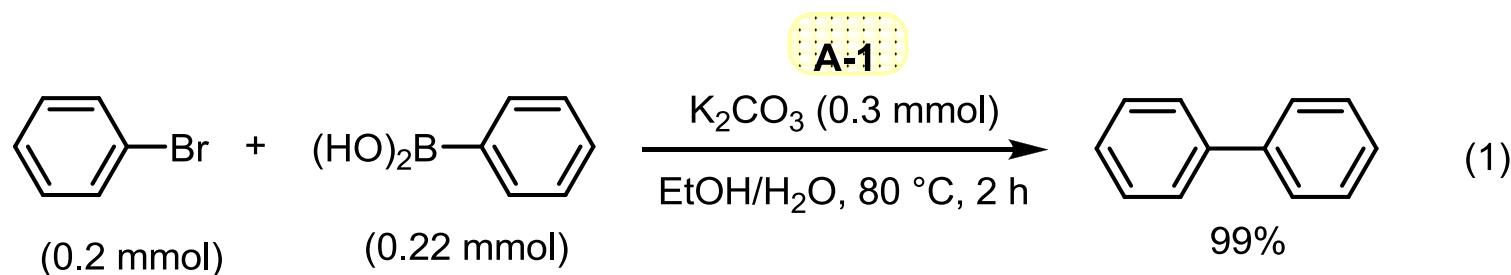
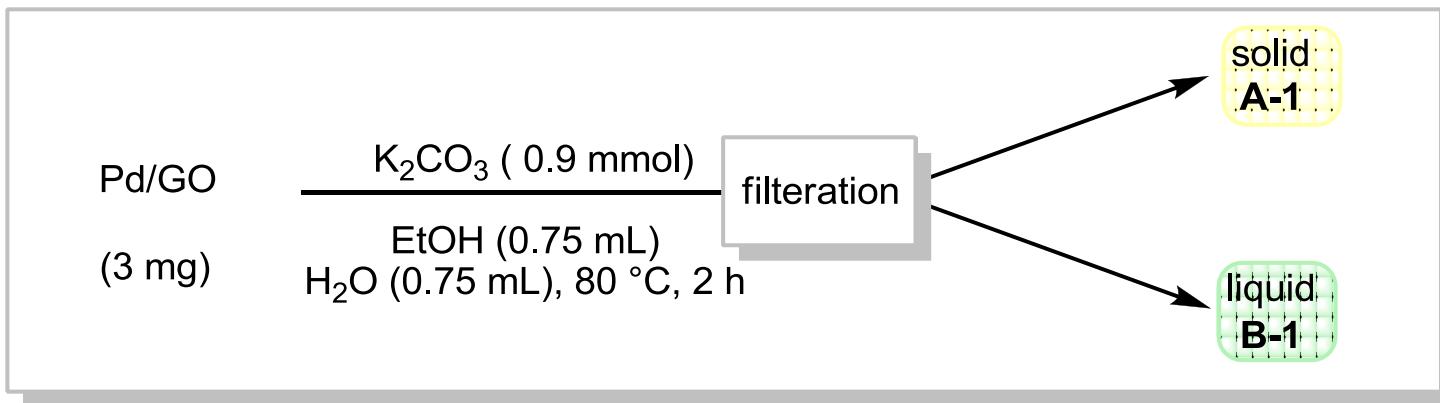


この両方の値が10,000を超えるものは稀である



Heterogeneous or Homogeneous?

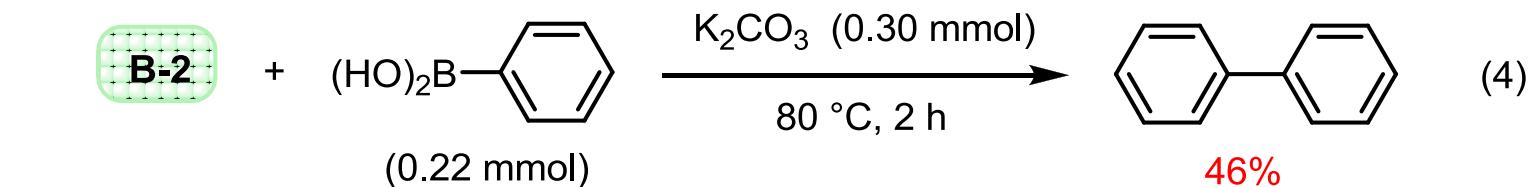
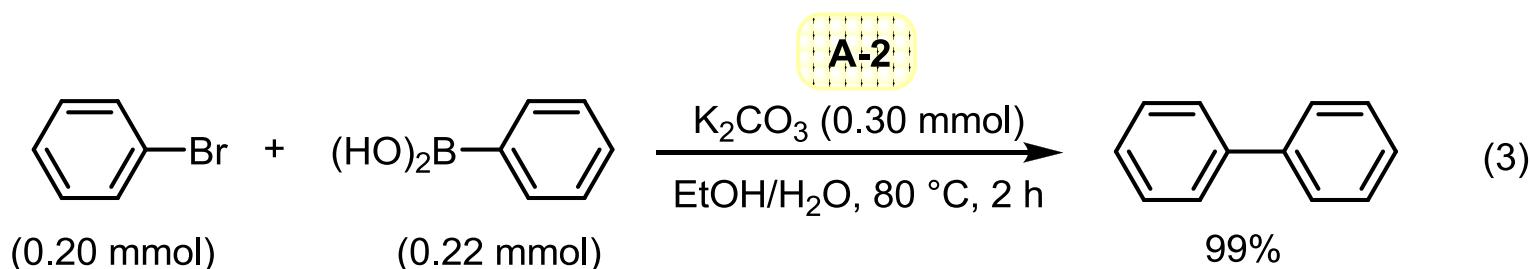
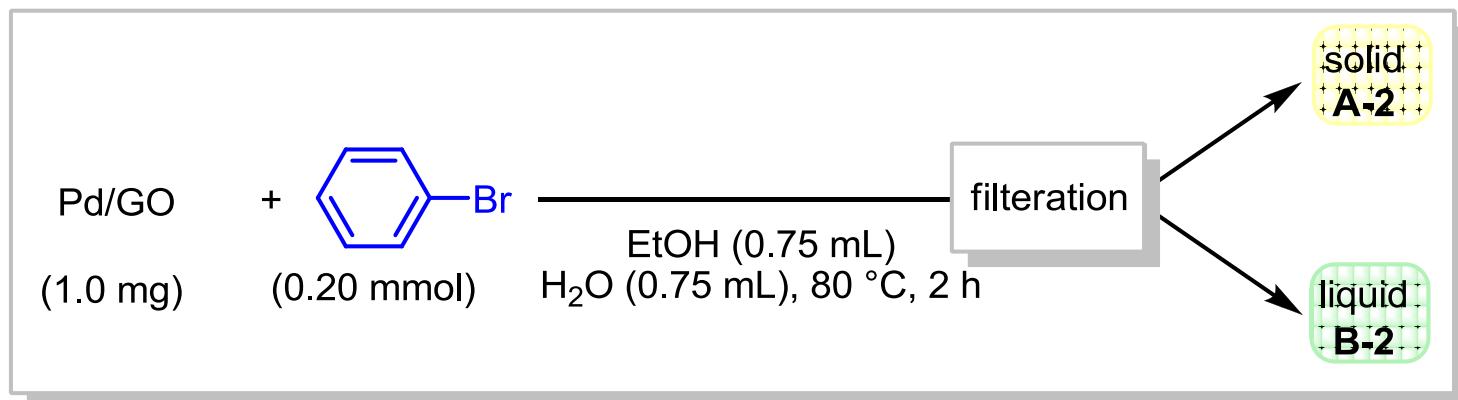
NiSiNa materials



Homogeneous Pd is not formed by heating with K_2CO_3 .

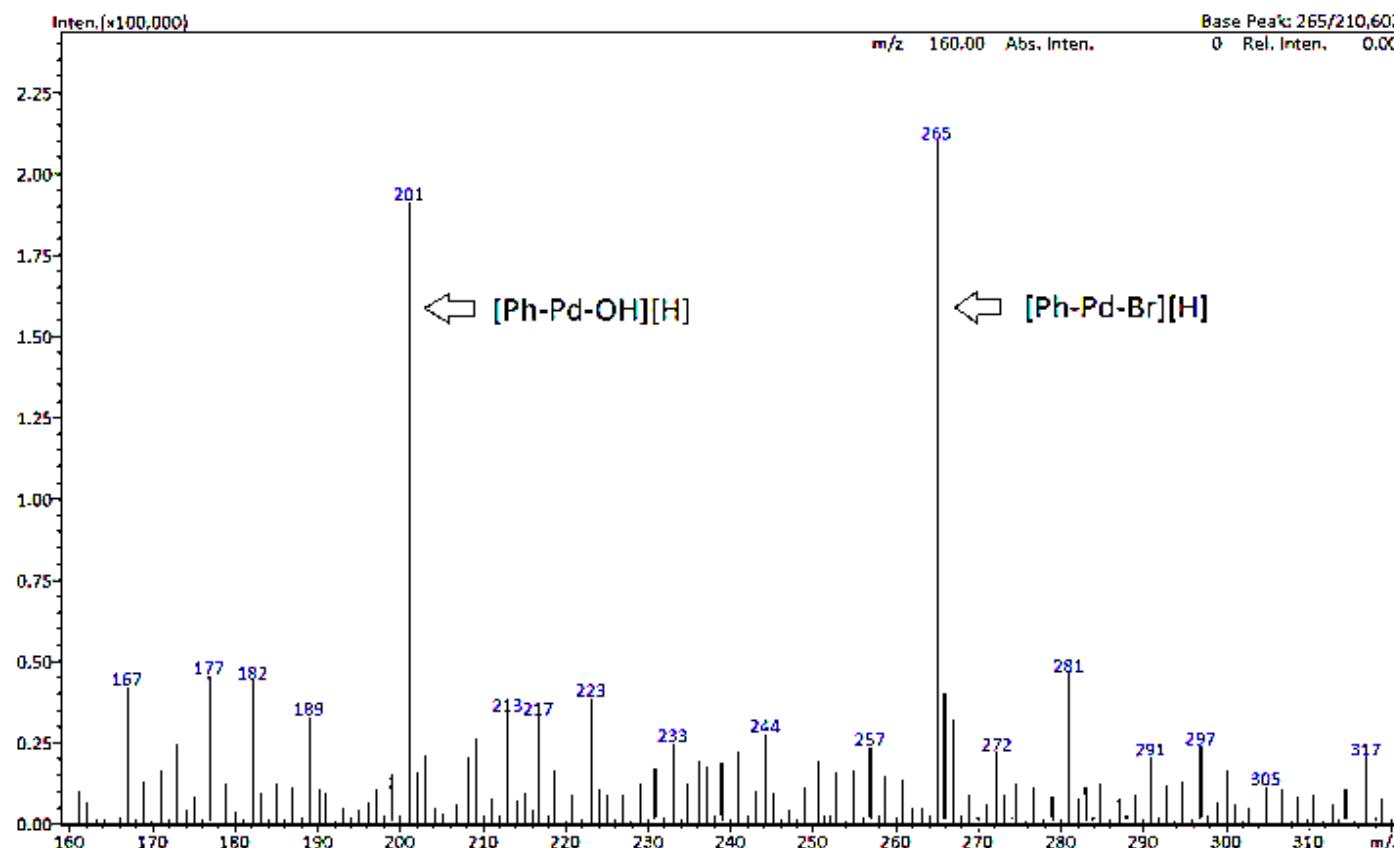
Heterogeneous or Homogeneous?

NiSiNa materials



Homogeneous Pd is formed by heating with PhBr.

Detection of Intermediate in B-2 by ESI(+)-MS

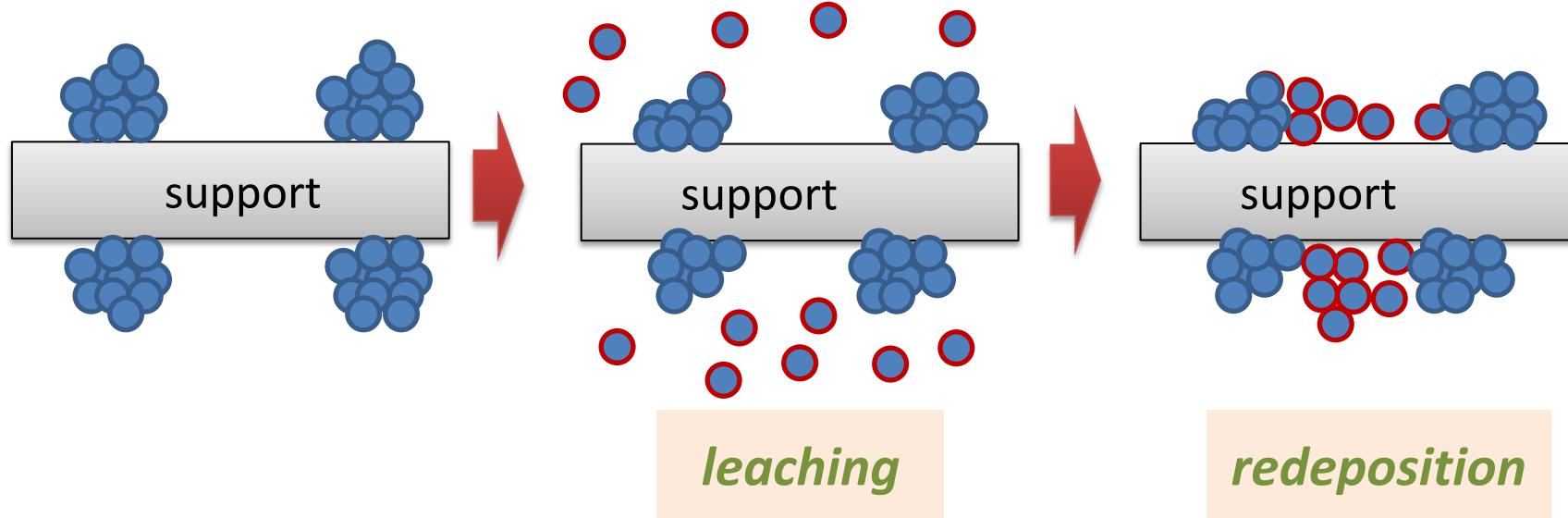


Homogeneous Pd is detected by ESI(+)-MS

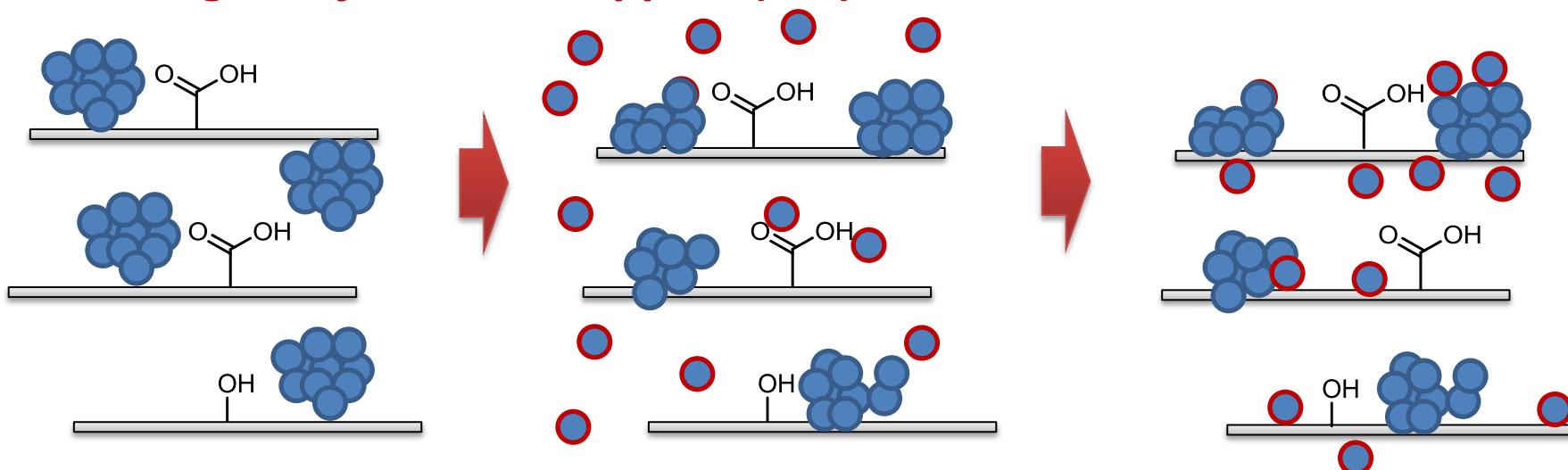
均一系Pd種が発生している。
しかし、反応後の溶液にはppbレベルのPdしか残留しない

Why Pd Particles are not Aggregated?

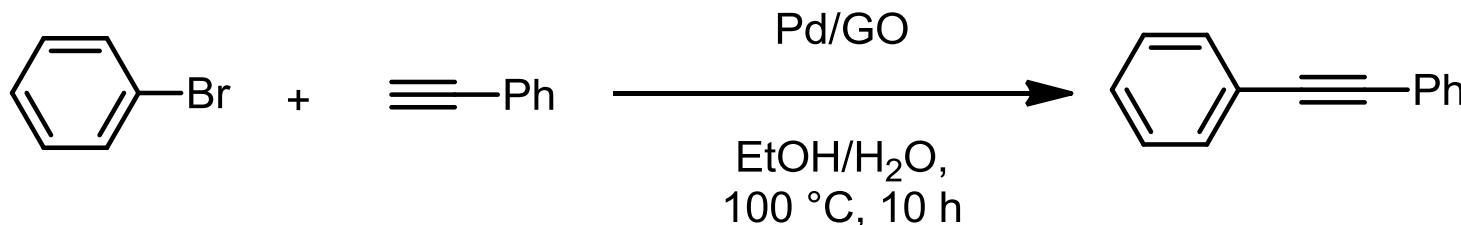
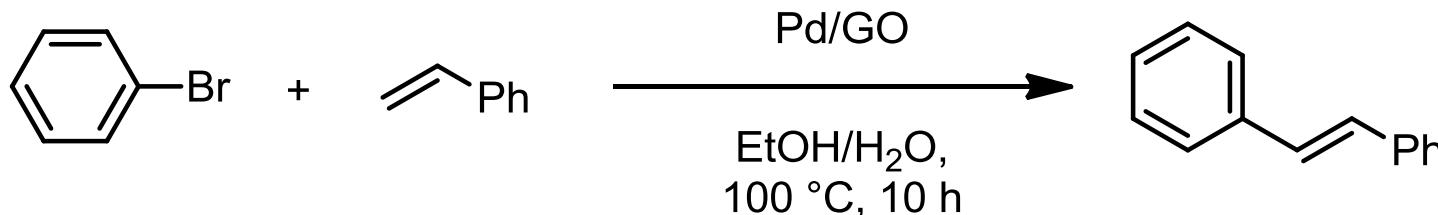
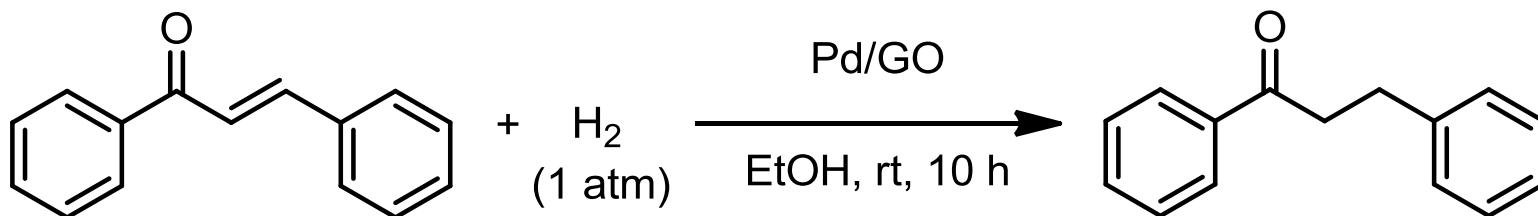
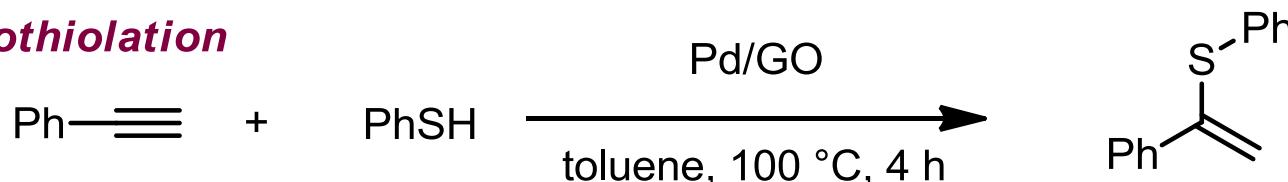
Common Pd/support catalyst



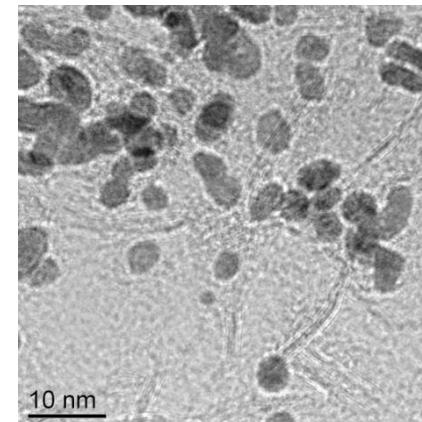
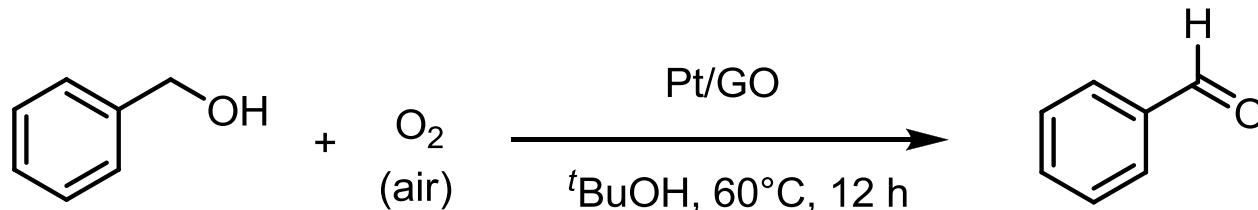
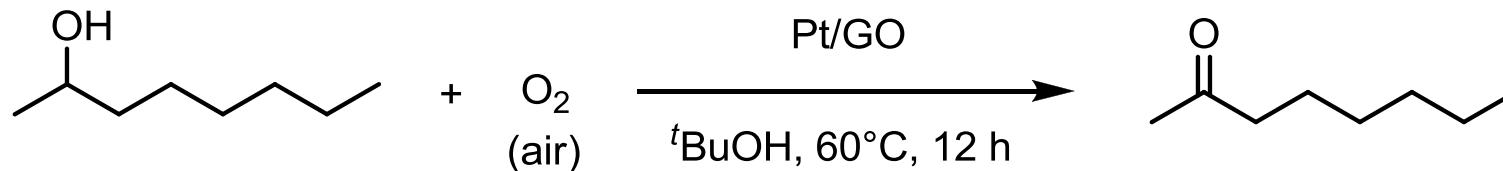
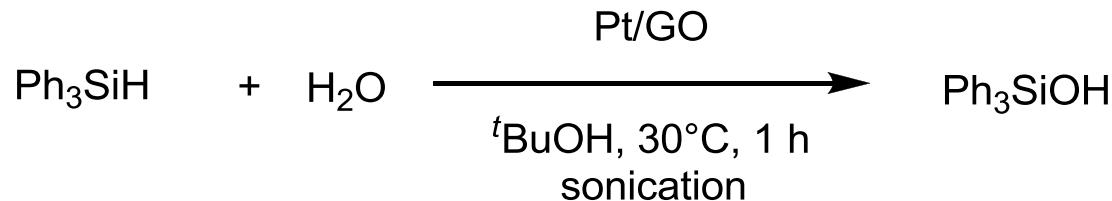
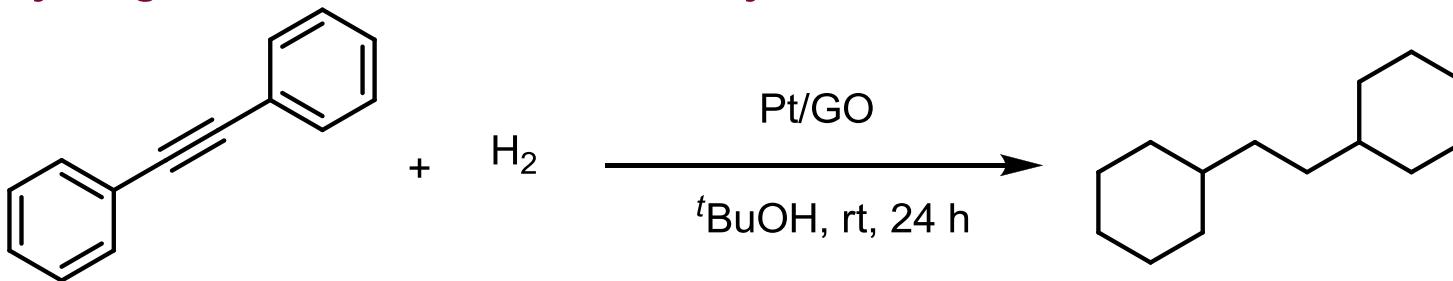
Pd on high surface area support (GO)

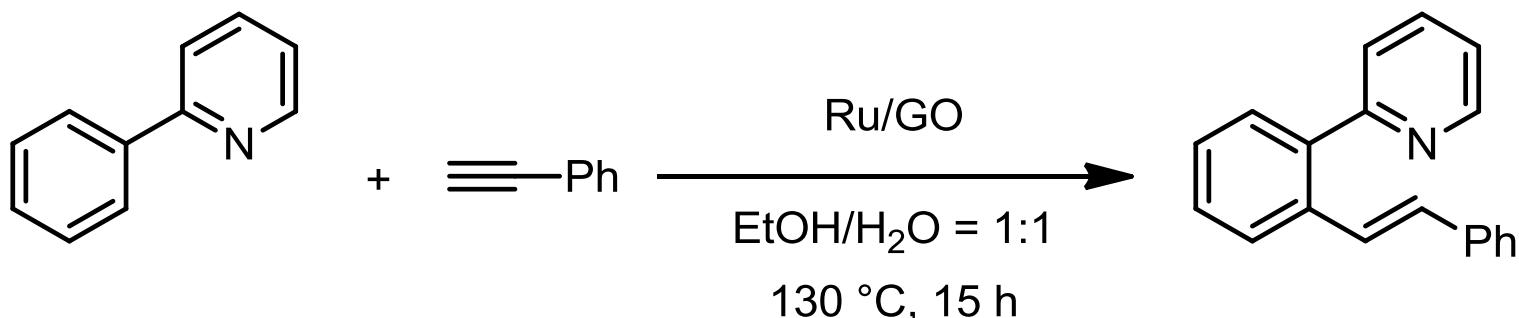
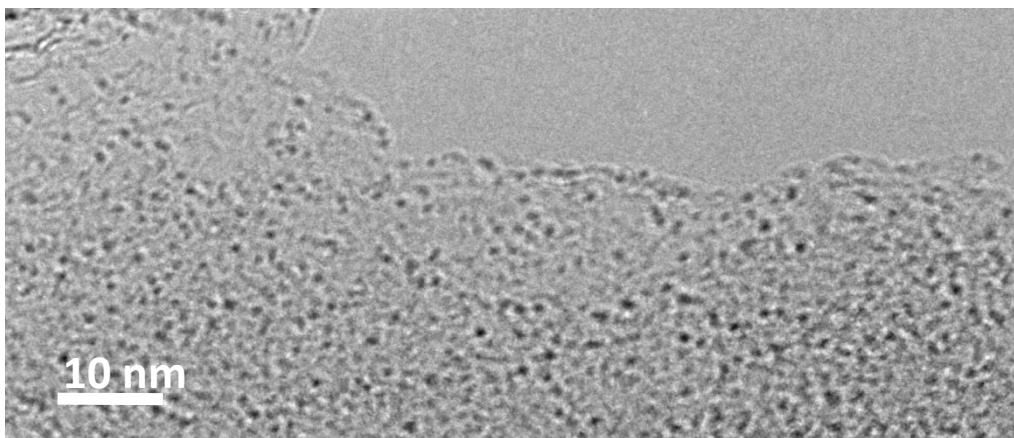
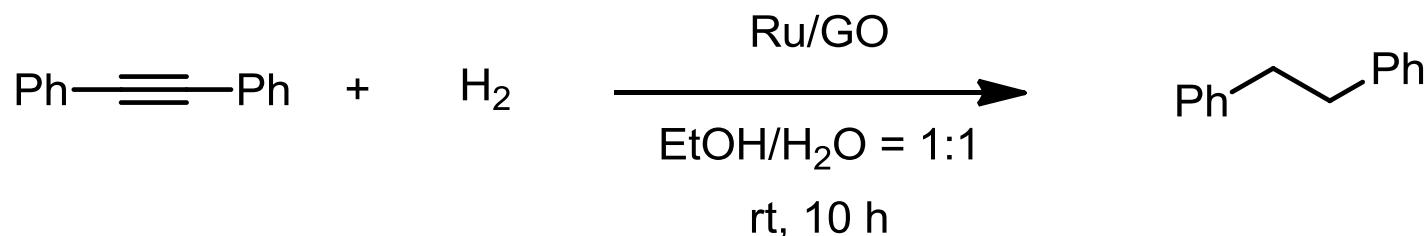


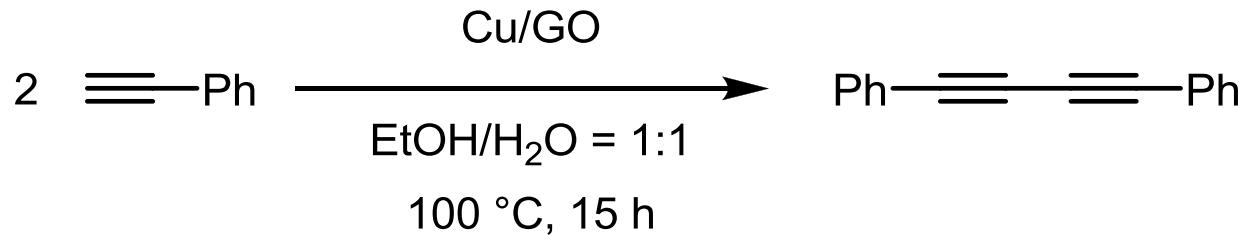
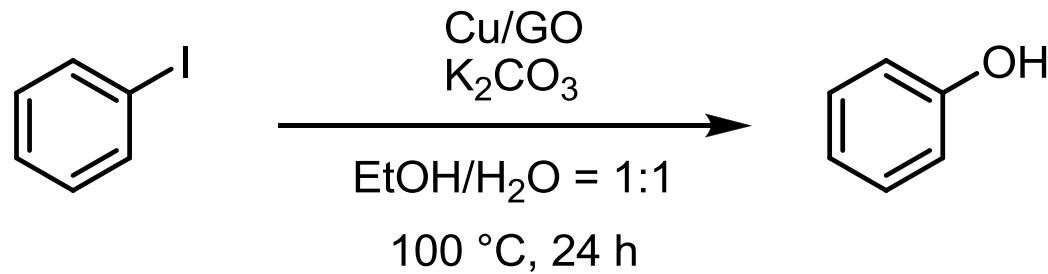
Other Reactions Catalyzed by Pd/GO

Sonogashira Reaction**Heck Reaction****Hydrogenation****Hydrothiolation**

Pd/GO showed Pd(0) character.

Oxidation to Aldehyde**Oxidation to Ketone****Oxidation of Hydrosilane****Hydrogenation of Aromatic and Alkyne Moieties**

C-H Bond Activation**Hydrogenation**

Dehydrative Dimerization of Alkyne***Hydroxylation of Aryl Halide***

Cu is deposited on molecular level

