Immobilization of Organic Functional Groups onto Silica

**Significance:** Functionalized vinylsilanes were prepared by hydroacylation of dimethyldivinylsilane with various aldehydes in the presence of (Ph₃P)₃RhCl, 2-amino-3-picoline, and 4-(trifluoromethyl)benzoic acid (63–92% yield, 11 examples). Immobilization of 3 onto silica by using [IrCl(coe)₂]₂ and DMA·HCl gave the corresponding functionalized silica compounds with 0.58–1.04 mmol/g of loading (11 examples).

**Comment:** The silica-immobilization method ([IrCl(coe)₂]₂; DMA·HCl) has been developed by the same authors (Org. Lett. 2007, 9, 4073). Surface modification of hydrophilic glass slides with vinylsilanes gave the significantly hydrophobic glass slides as estimated from contact angle measurements.

**Selected examples:**

- **3a:** 50% yield, 0.90 mmol/g
- **3b:** 70% yield, 1.04 mmol/g
- **3c:** 63% yield, 0.64 mmol/g
- **3d:** 81% yield, 0.88 mmol/g
- **3e:** 81% yield, 0.88 mmol/g
- **3f:** 81% yield, 0.88 mmol/g
- **3g:** 81% yield, 0.88 mmol/g

**Preparation of the dansyl group functionalized silica:**

1. **3a:** 90% yield, 0.70 mmol/g of loading
2. **3b:** 90% yield, 0.65 mmol/g of loading
3. **3c:** 90% yield, 0.65 mmol/g of loading
4. **3d:** 90% yield, 0.65 mmol/g of loading
5. **3e:** 90% yield, 0.65 mmol/g of loading
6. **3f:** 90% yield, 0.65 mmol/g of loading
7. **3g:** 90% yield, 0.65 mmol/g of loading

**Surface modification of glass slides:**

1. **3e:** R = n-C₃H₇, contact angle of water: 7°
2. **3f:** R = n-C₆H₁₃, contact angle of water: 71°
3. **3g:** R = n-C₉H₁₉, contact angle of water: 94°