Immobilization of Organic Functional Groups onto Silica

**Significance:** Functionalized vinylsilanes 3 were prepared by hydroacylation of dimethyldivinylsilane (2) with various aldehydes 1 in the presence of (Ph₃P)₂RhCl, 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 4 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 3e–g gave the significantly hydrophobic glass slides 9e–g as estimated from contact angle measurements.

**Selected examples:**

- **3a** 92% yield, 4a: 0.90 mmol/g
- **3b** 70% yield, 4b: 1.04 mmol/g
- **3c** 63% yield, 4c: 0.64 mmol/g
- **3d** 81% yield, 4d: 0.88 mmol/g
- **3e** n = 1, 4e: 0.94 mmol/g
- **3f** n = 4, 4f: 0.94 mmol/g
- **3g** n = 7, 4g: 0.87 mmol/g

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

**Surface modification of glass slides:**

Contact angle of water: 7° (3e, R = n-C₃H₇)
* Contact angle of water: 71° (9e, R = n-C₃H₇)
* Contact angle of water: 81° (9f, R = n-C₆H₁₃)
* Contact angle of water: 94° (9g, R = n-C₉H₁₉)