Direct Difluoroethylation of Heteroaromatics, Michael Acceptors and Thiols

**Significance:** A novel protocol for direct difluoroethylation of a broad range of heterocycles, Michael acceptors and even thiols with sodium difluoroethylsulfinate (DFES-Na) has been described. DFES-Na is shown to be compatible with various sensitive functional groups, reacts site selectively in high conversion and is easy to handle.

**Comment:** Interestingly, performing the reaction with DFES-Na and tert-butylhydroperoxide (TBHP) solely results in only traces of the desired product. Only after addition of stoichiometric amounts of ZnCl₂ and TsOH·H₂O, the product is obtained in high yield.

R₁ = various substituted heteroaromatics, Michael acceptors and thiols
R₂ = Me, CH₂-4-BrC₆H₄, (CH₂)₆Cl

Selected examples:

- ![Product 1](image1.png)
  - 92% yield
- ![Product 2](image2.png)
  - 58% yield
- ![Product 3](image3.png)
  - 44% yield
- ![Product 4](image4.png)
  - 67% yield
- ![Product 5](image5.png)
  - 51% yield
- ![Product 6](image6.png)
  - 83% yield
- ![Product 7](image7.png)
  - 66% yield
- ![Product 8](image8.png)
  - 83% yield
- ![Product 9](image9.png)
  - 56% yield