Reactivity Scales

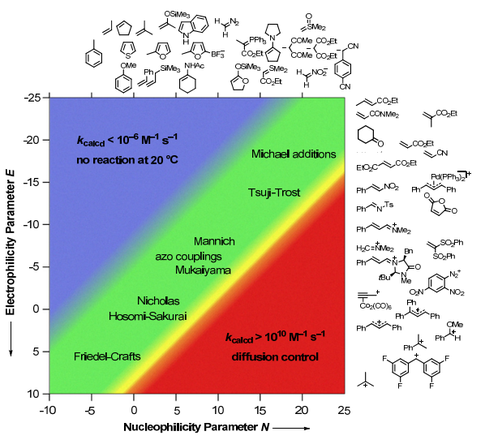
The reactivity poster shows a selection of the published reactivity parameters E, N, and s_N, which allow the calculation of the rate constants for combination reactions of electrophiles with nucleophiles, with the following equation:

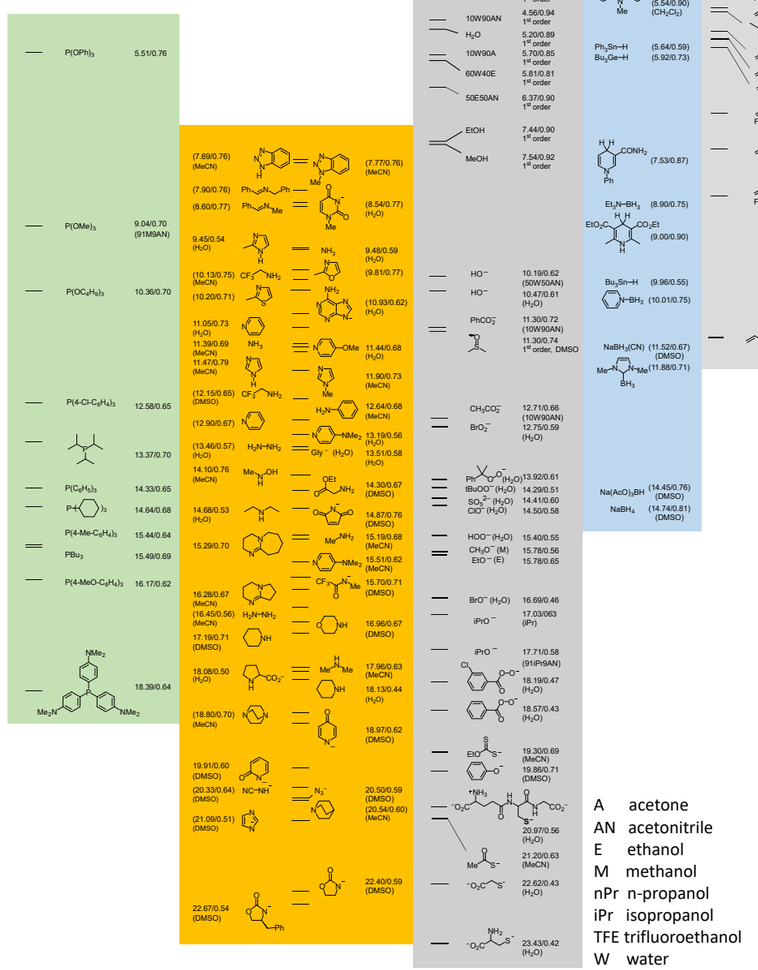
$$\log k_{20°C} = s_N(N + E)$$

E = electrophilicity parameter
N = nucleophilicity parameter
s_N = nucleophile-specific sensitivity parameter
(N and s_N are solvent-dependent; solvent is CH_2Cl_2 if not mentioned otherwise)

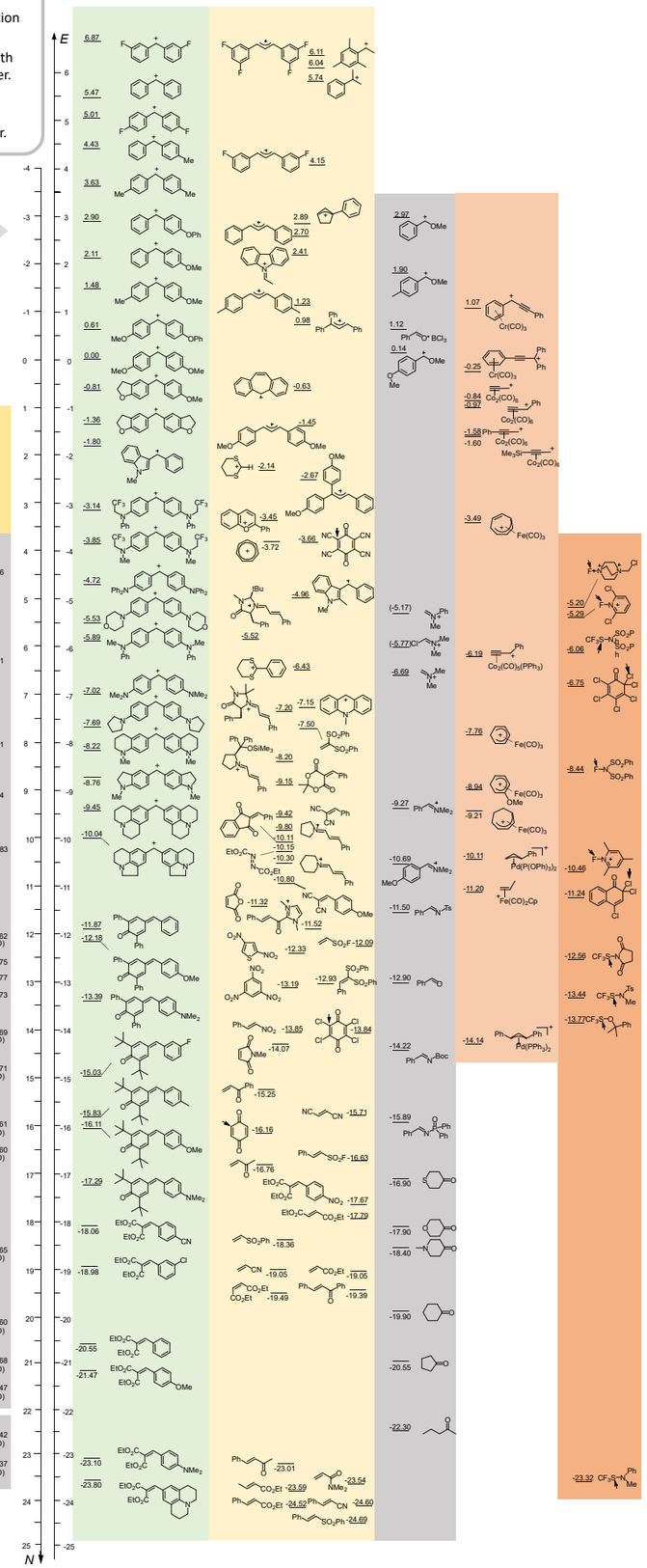
How to read the scales:

- Nucleophiles and electrophiles located on the same level ($E + N = 0$) combine with rate constants of $k \approx 1\ M^{-1}\ s^{-1}$ at 20 °C, corresponding to half-reaction times of 10 seconds for 0.1 M solutions.
- At 20 °C electrophiles will generally not react with nucleophiles positioned more than 5 units higher.
- Electrophiles will generally undergo diffusion controlled (often unselective) reactions with nucleophiles positioned more than 9 units lower.





A acetone
AN acetonitrile
E ethanol
M methanol
nPr n-propanol
iPr isopropanol
TFE trifluoroethanol
W water



Nucleophiles

Further reactivity parameters are accessible at:
www.cup.lmu.de/oc/mayr/DBintro.html

Electrophiles

Get your free pdf of Mayr's Reactivity Scales Poster at:
www.cup.lmu.de/oc/mayr/MayrPoster.html