

Calculate the ligand density of a bonded phase of an HPLC column – How To

The ligand density can be calculated using the Berendsen-de Galan equation:

$$\alpha = 10^6 \%C / (10^2 MW_{\text{carbon}} nC - \%C MW_{\text{ligand}}) SBET$$

where α is the ligand density ($\mu\text{mol}/\text{m}^2$), $\%C$ is the percent carbon (%), MW_{carbon} is the molecular weight of carbon (g/mol), nC is the number of carbon atoms per bonded ligand, MW_{ligand} is the molecular weight of the organic bonded ligand (g/mol), and $SBET$ is the specific surface area of silica material (m^2/g).

For example, the ligand density of the Cogent UDC-Cholesterol™ stationary phase comes out to approximately $1.5 \mu\text{mol}/\text{m}^2$ using this equation.