Kirk's Amino Acids Chart

Note: an amino acid may be considered to belong to more than one category. For charge state, consider physiological condition (~pH 7). The range of pKa for α-COOH (1.7-2.6) and for α-NH_3^+ (8.8 to 10.8).

Name	Letter Codes	Chemical Structure of Side Chain R	Hydrophobic	Polar	Charged	Aromatic	Side Chain pKa
Alanine	Ala A	—CH_3	Y	N	N	N	
Arginine	Arg R	—$(CH_2)_3NH$-C(NH)NH_2	Y	Y/N	Y(+)	N	12.5
Asparagine	Asn N	—CH_2CONH_2	N	Y/N	N	N	
Aspartic acid	Asp D	—CH_2COOH	N	Y/N	Y(-)	N	3.9
Cysteine	Cys C	—CH_2SH	Y/N	Y/N	N	N	8.3
Glutamine	Gln Q	—$CH_2CH_2CONH_2$	N	Y/N	N	N	
Glutamic acid	Glu E	—CH_2CH_2COOH	N	Y/N	Y(-)	N	4.3
Glycine	Gly G	—H	Y/N	Y/N**	N	N	
Histidine	His H	—CH_2-$C_3H_3N_2$	Y	Y/N	Y(+)	Y	6.0
Isoleucine	Ile I	—$CH(CH_3)CH_2CH_3$	Y	N	N	N	
Leucine	Leu L	—$CH_2CH(CH_3)_2$	Y	N	N	N	
Lysine	Lys K	—$(CH_2)_4NH_2$	Y	Y/N	Y(+)	N	10.5
Methionine	Met M	—$CH_2CH_2SCH_3$	Y	N	N	N	
Phenylalanine	Phe F	—$CH_2C_6H_5$	Y	N	N	Y	
Proline	Pro P	—$CH_2CH_2CH_2$-	Y	N	N	N	
Serine	Ser S	—CH_2OH	Y/N	Y/N	N	N	13
Threonine	Thr T	—$CH(OH)CH_3$	Y	Y/N	N	N	13
Tryptophan	Trp W	—$CH_2C_8H_6N$	Y	Y/N*	N	Y	
Tyrosine	Tyr Y	—CH_2-C_6H_4OH	Y	Y/N*	N	Y	10.1
Valine	Val V	—$CH(CH_3)_2$	Y	N	N	N	

AVLIPMF have entirely nonpolar R groups. The rest are amphiphilic (varying amounts of polar and nonpolar parts).
*Y and W have the smallest polar portion.
**Glycine with only H as its R group can be accommodated in both polar and nonpolar environments. As such, it is found both inside and on the surface of proteins. Its polar peptide linkages are the major determinant of its property.

20 Standard Amino Acids