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Application of non-linear free energy relationships to parachors (P) of some aromatic and aliphatic compounds

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The present study involves the effect of substituents on parachors (P) of five aromatic and five aliphatic series. Non-linear Hammett and Taft correlations for both aromatic and aliphatic series have been observed. Both the plots give negative slopes (ρ and ρ^*) for electron donating groups and positive slopes (ρ and ρ^*) for electron withdrawing groups. The plots of aromatic series have intersecting point at H (Hammett $\sigma = 0$) and the plots of aliphatic series have their intersecting point at CH_3 (Taft $\sigma^* = 0$). We are the first ones to observe the conformity of LFER to the physical property parachor. Plausible interpretations for the conformity of LFER to parachors are presented.

Keywords: Parachor (P), Hammett equation, Taft equation, Non-linear free energy relationships (LFER)