

**Molecular Electronic States Resulting From Given States
of the Separated (Unlike) Atoms**

States of the Separated Atoms	Molecular States
$S_g + S_g$ or $S_u + S_u$	Σ^+
$S_g + S_u$	Σ^-
$S_g + P_g$ or $S_u + P_u$	Σ^-, Π
$S_g + P_u$ or $S_u + P_g$	Σ^+, Π
$S_g + D_g$ or $S_u + D_u$	Σ^+, Π, Δ
$S_g + D_u$ or $S_u + D_g$	Σ^-, Π, Δ
$S_g + F_g$ or $S_u + F_u$	$\Sigma^-, \Pi, \Delta, \Phi$
$S_g + F_u$ or $S_u + F_g$	$\Sigma^+, \Pi, \Delta, \Phi$
$P_g + P_g$ or $P_u + P_u$	$\Sigma^+(2), \Sigma^-, \Pi(2), \Delta$
$P_g + P_u$	$\Sigma^+, \Sigma^-(2), \Pi(2), \Delta$
$P_g + D_g$ or $P_u + D_u$	$\Sigma^+, \Sigma^-(2), \Pi(3), \Delta(2), \Phi$
$P_g + D_u$ or $P_u + D_g$	$\Sigma^+(2), \Sigma^-, \Pi(3), \Delta(2), \Phi$
$P_g + F_g$ or $P_u + F_u$	$\Sigma^+(2), \Sigma^-, \Pi(3), \Delta(3), \Phi(2), \Gamma$
$P_g + F_u$ or $P_u + F_g$	$\Sigma^+, \Sigma^-(2), \Pi(3), \Delta(3), \Phi(2), \Gamma$
$D_g + D_g$ or $D_u + D_u$	$\Sigma^+(3), \Sigma^-(2), \Pi(4), \Delta(3), \Phi(2), \Gamma$
$D_g + D_u$	$\Sigma^+(2), \Sigma^-(3), \Pi(4), \Delta(3), \Phi(2), \Gamma$
$D_g + F_g$ or $D_u + F_u$	$\Sigma^+(2), \Sigma^-(3), \Pi(5), \Delta(4), \Phi(3), \Gamma(2), H$
$D_g + F_u$ or $D_u + F_g$	$\Sigma^+(3), \Sigma^-(2), \Pi(5), \Delta(4), \Phi(3), \Gamma(2), H$

References:

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R. S. Mulliken, *Rev. Mod. Phys.* **4**, 1 (1932).