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SnF_2

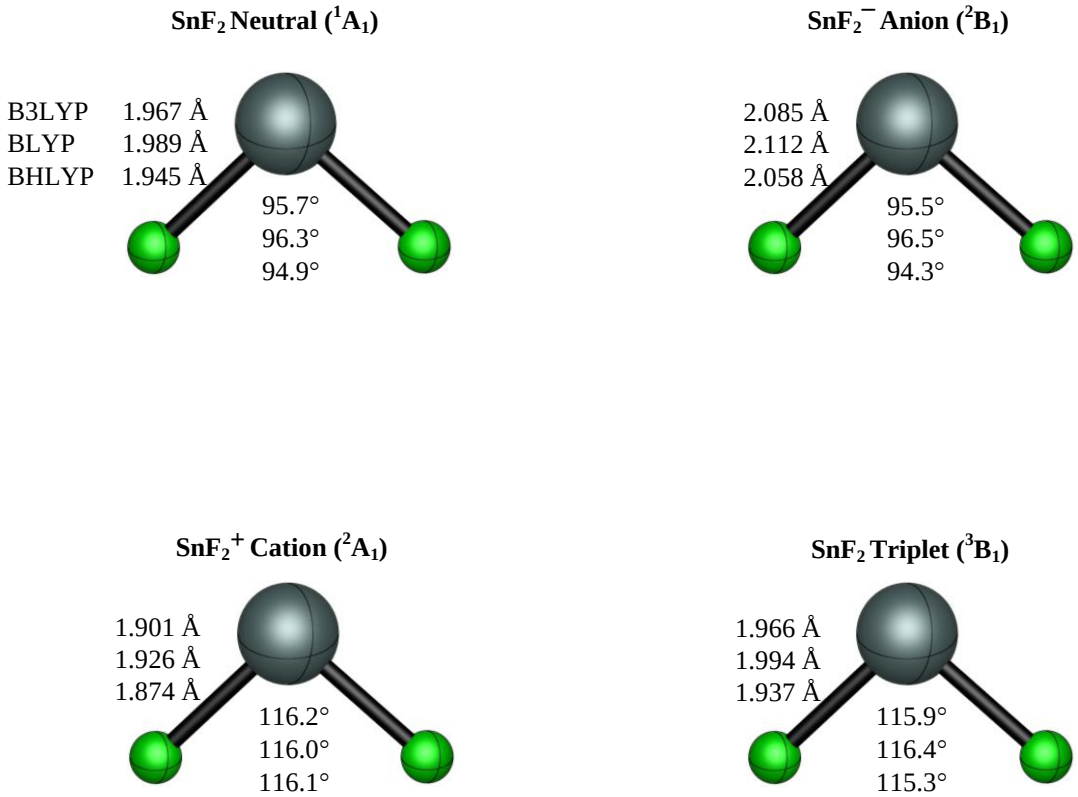


Figure S1. Equilibrium geometries for the $^1A_1$ ground state of SnF_2, $^2B_1$ ground state of the SnF_2^- anion, $^2A_1$ ground state of the SnF_2^+ cation, and $^3B_1$ excited state of neutral SnF_2.

$SnCl_2$

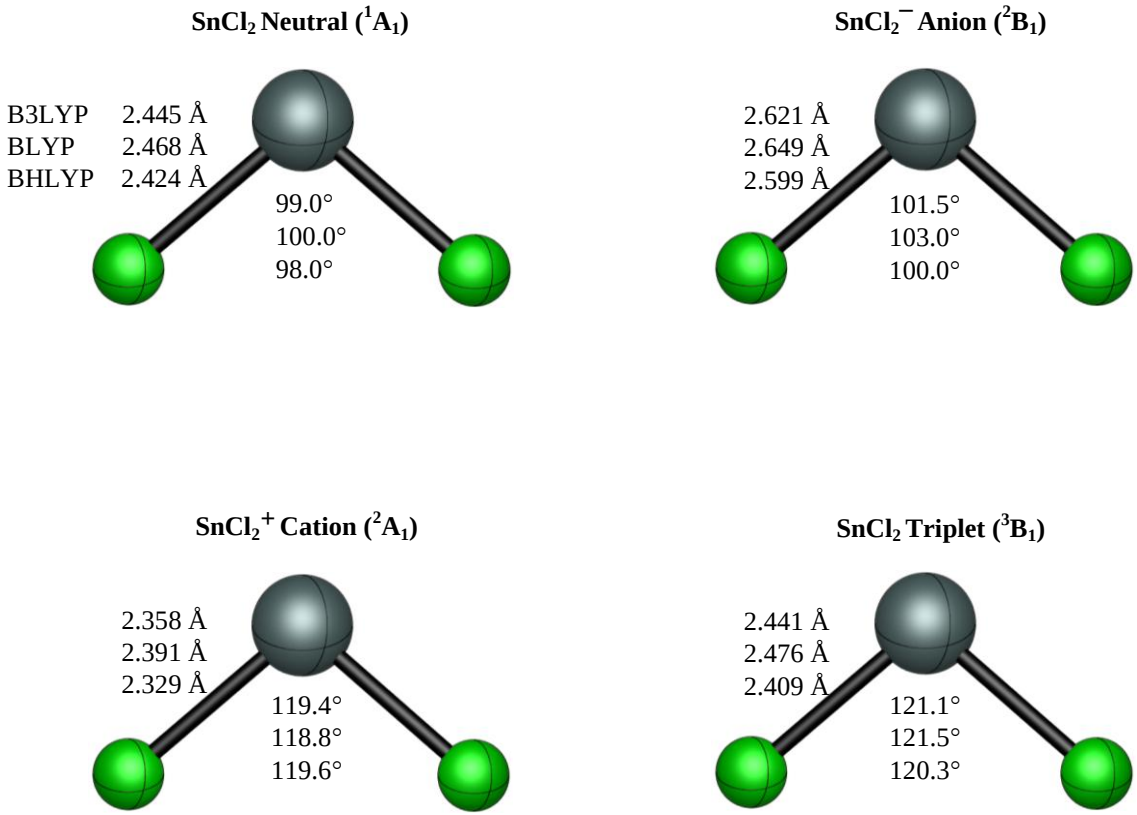


Figure S2. Equilibrium geometries for the $^1A_1$ ground state of $SnCl_2$, $^2B_1$ ground state of the $SnCl_2^-$ anion, $^2A_1$ ground state of the $SnCl_2^+$ cation, and $^3B_1$ excited state of neutral $SnCl_2$.

$SnBr_2$

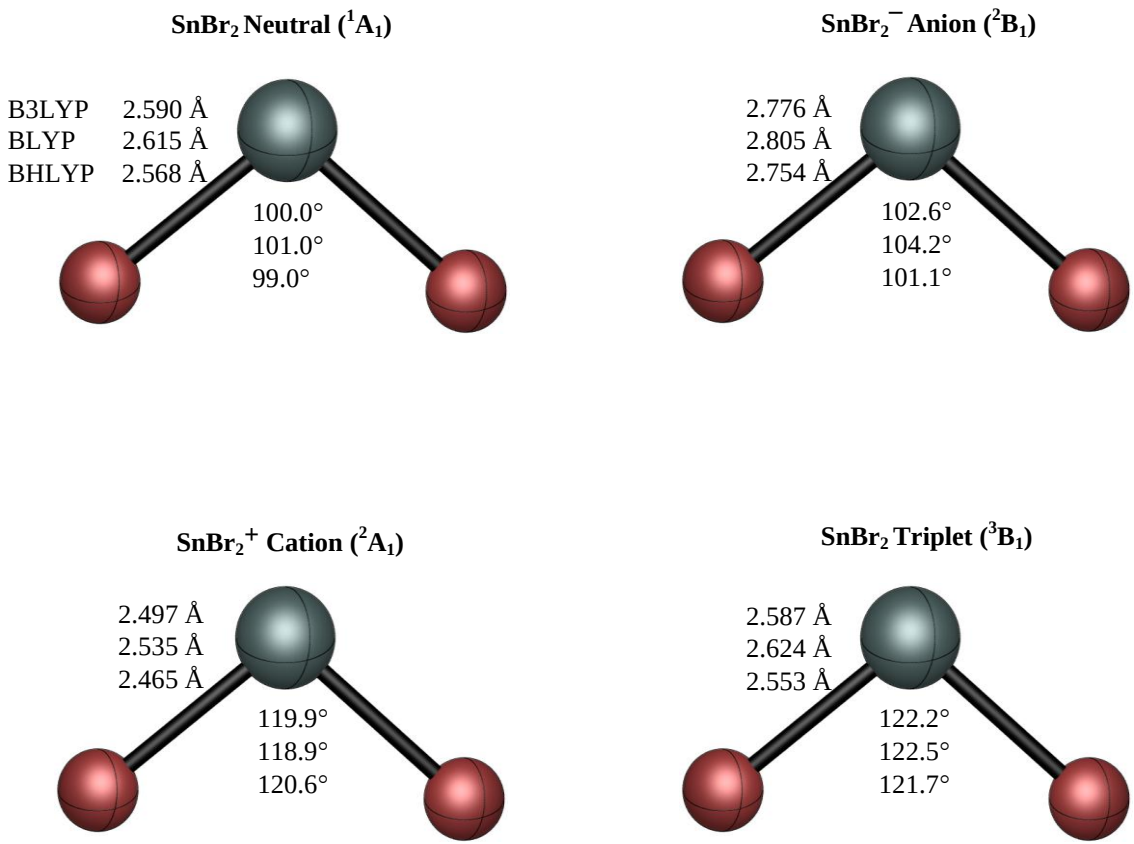


Figure S3. Equilibrium geometries for the $^1A_1$ ground state of $SnBr_2$, $^2B_1$ ground state of the $SnBr_2^-$ anion, $^2A_1$ ground state of the $SnBr_2^+$ cation, and $^3B_1$ excited state of neutral $SnBr_2$.

SnI_2

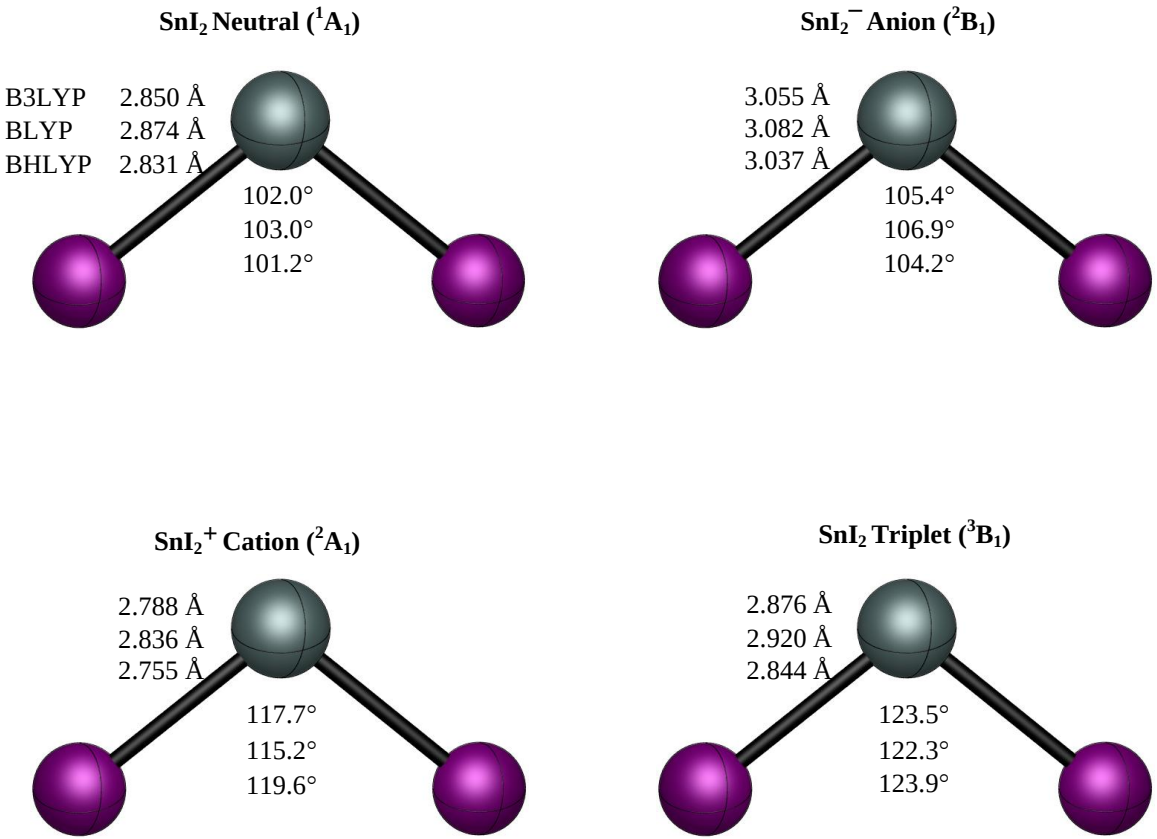


Figure S4. Equilibrium geometries for the $^1A_1$ ground state of SnI_2, $^2B_1$ ground state of the SnI_2^- anion, $^2A_1$ ground state of the SnI_2^+ cation, and $^3B_1$ excited state of neutral SnI_2.

SnHF

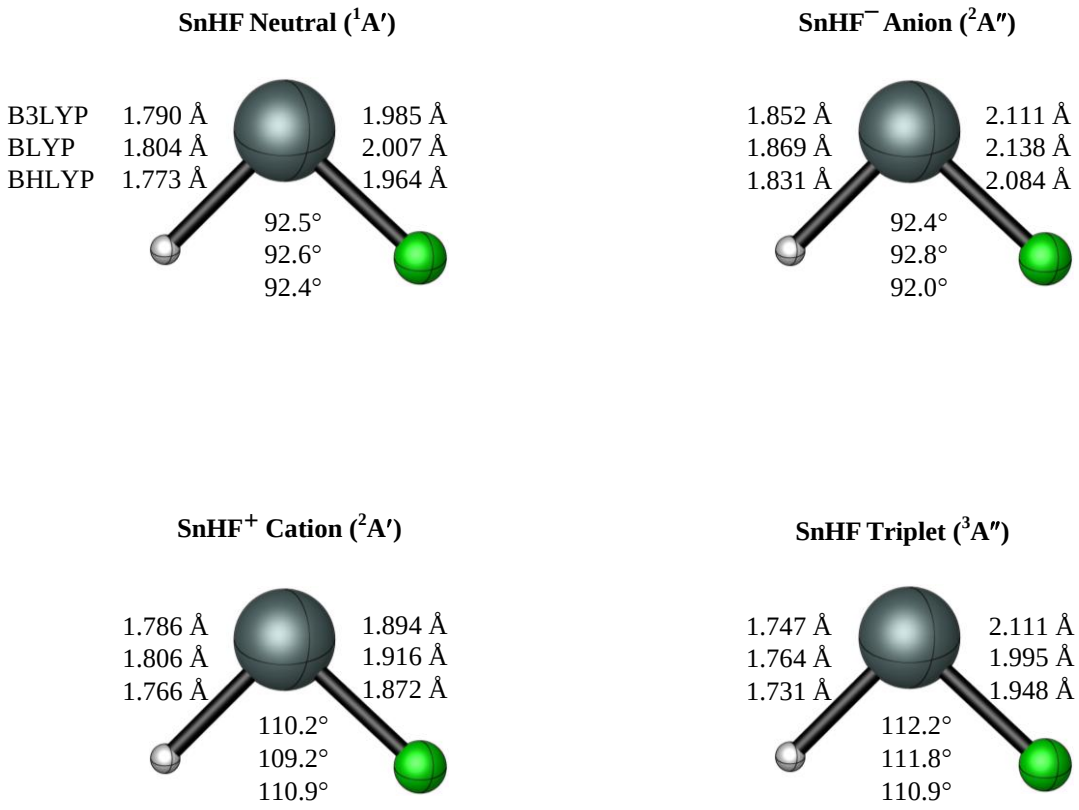


Figure S5. Equilibrium geometries for the ^{1}A′ ground state of SnHF, ^{2}A″ ground state of the SnHF$^-$ anion, ^{2}A′ ground state of the SnHF$^+$ cation, and ^{3}A″ excited state of neutral SnHF.

SnHCl

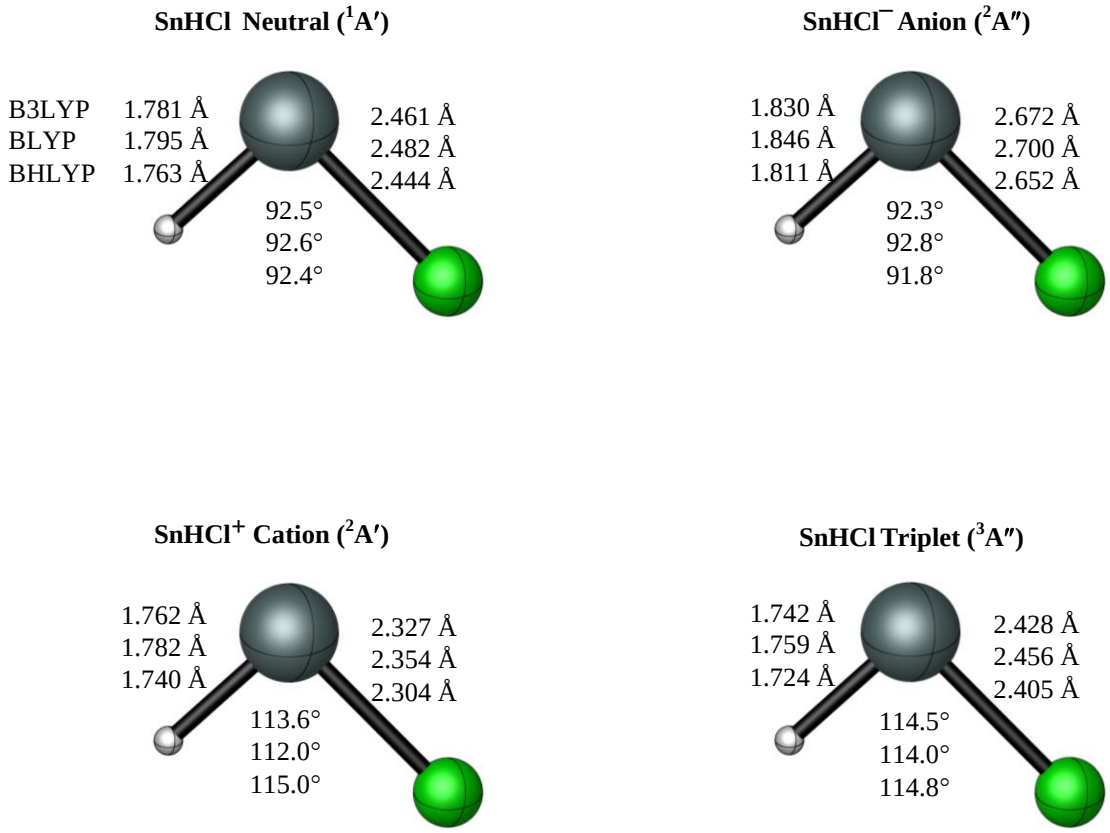


Figure S6. Equilibrium geometries for the $^{1}A'$ ground state of SnHCl, $^{2}A''$ ground state of the $SnHCl^{-}$ anion, $^{2}A'$ ground state of the $SnHCl^{+}$ cation, and $^{3}A''$ excited state of neutral SnHCl.

SnHBr

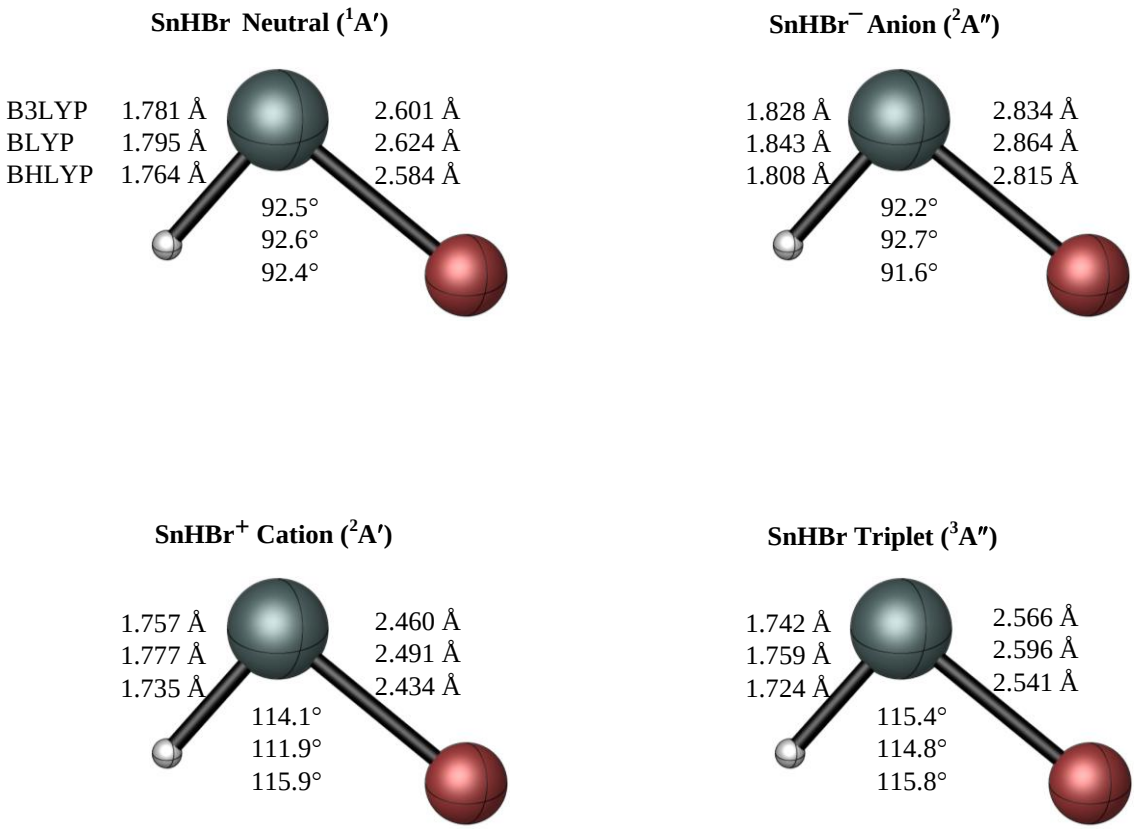


Figure S7. Equilibrium geometries for the $^1A'$ ground state of SnHBr, $^2A''$ ground state of the $SnHBr^-$ anion, $^2A'$ ground state of the $SnHBr^+$ cation, and $^3A''$ excited state of neutral SnHBr.

SnHI

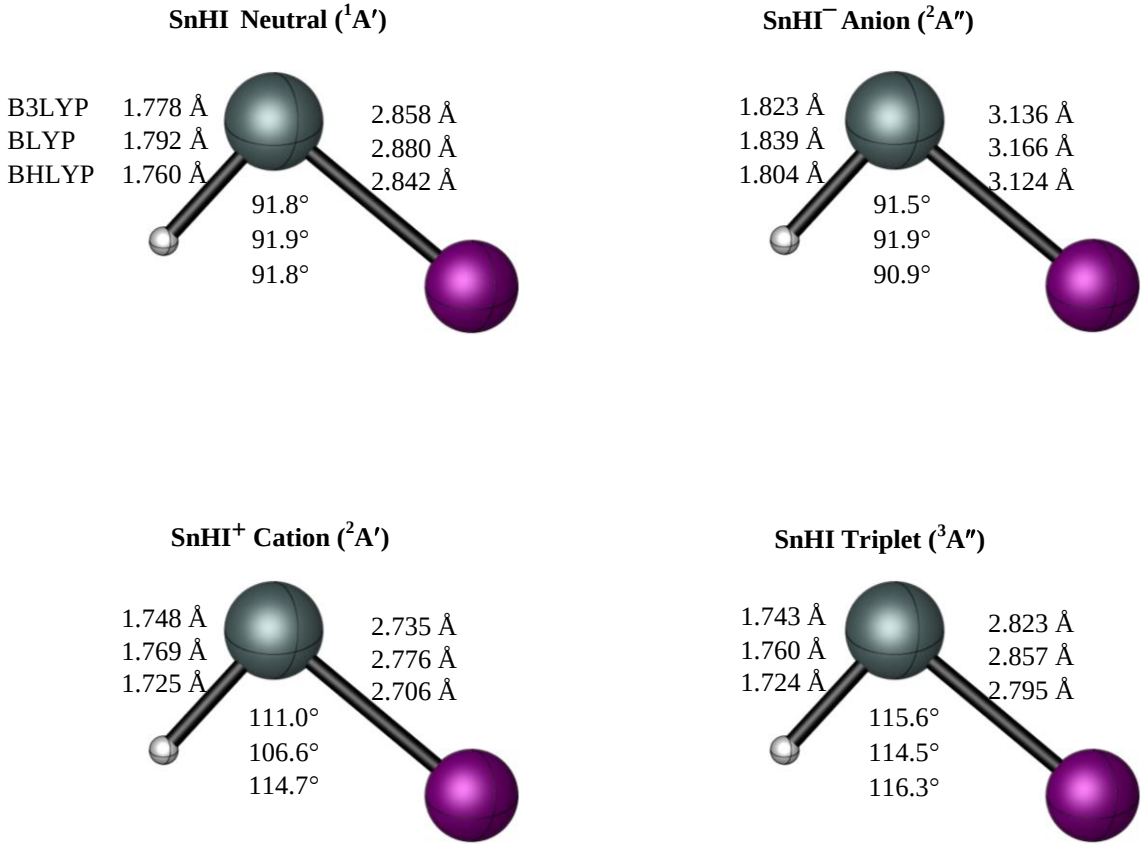


Figure S8. Equilibrium geometries for the ^{1}A′ ground state of SnHI, ^{2}A″ ground state of the SnHI$^-$ anion, ^{2}A′ ground state of the SnHI$^+$ cation, and ^{3}A″ excited state of neutral SnHI.

SnFCl

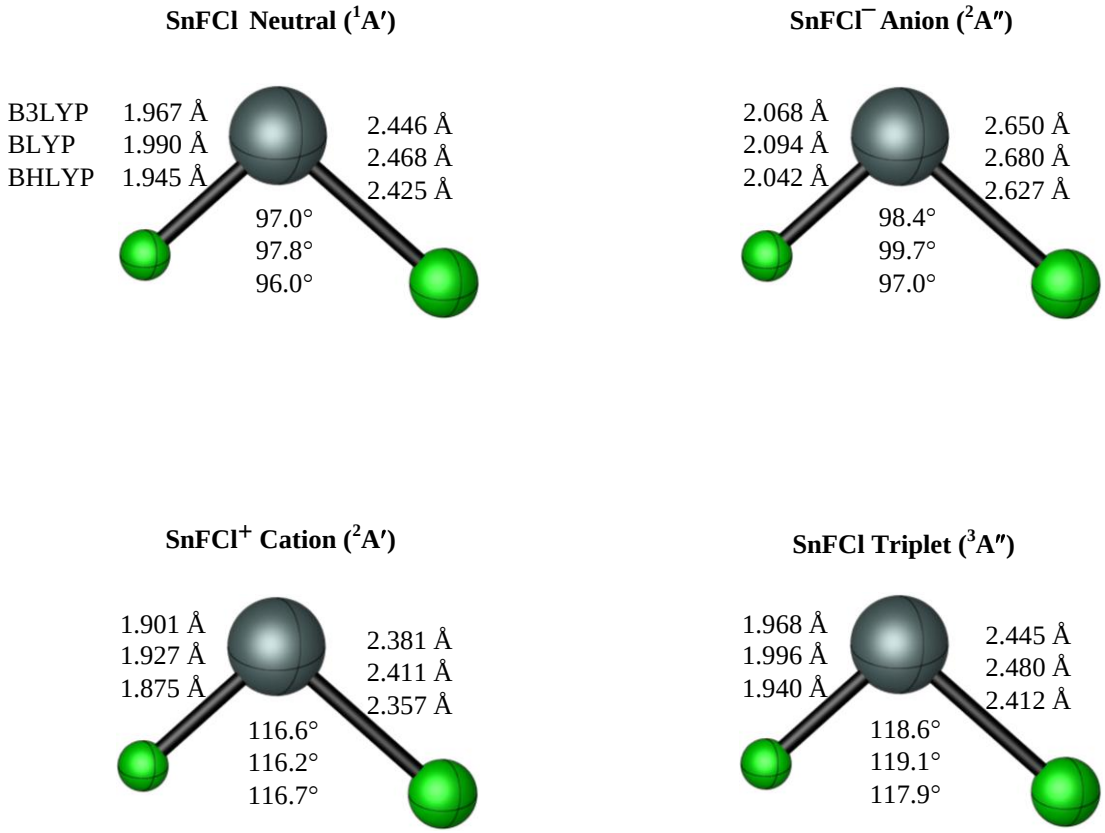


Figure S9. Equilibrium geometries for the $^1A'$ ground state of SnFCl, $^2A''$ ground state of the $SnFCl^-$ anion, $^2A'$ ground state of the $SnFCl^+$ cation, and $^3A''$ excited state of neutral SnFCl.

SnFBr

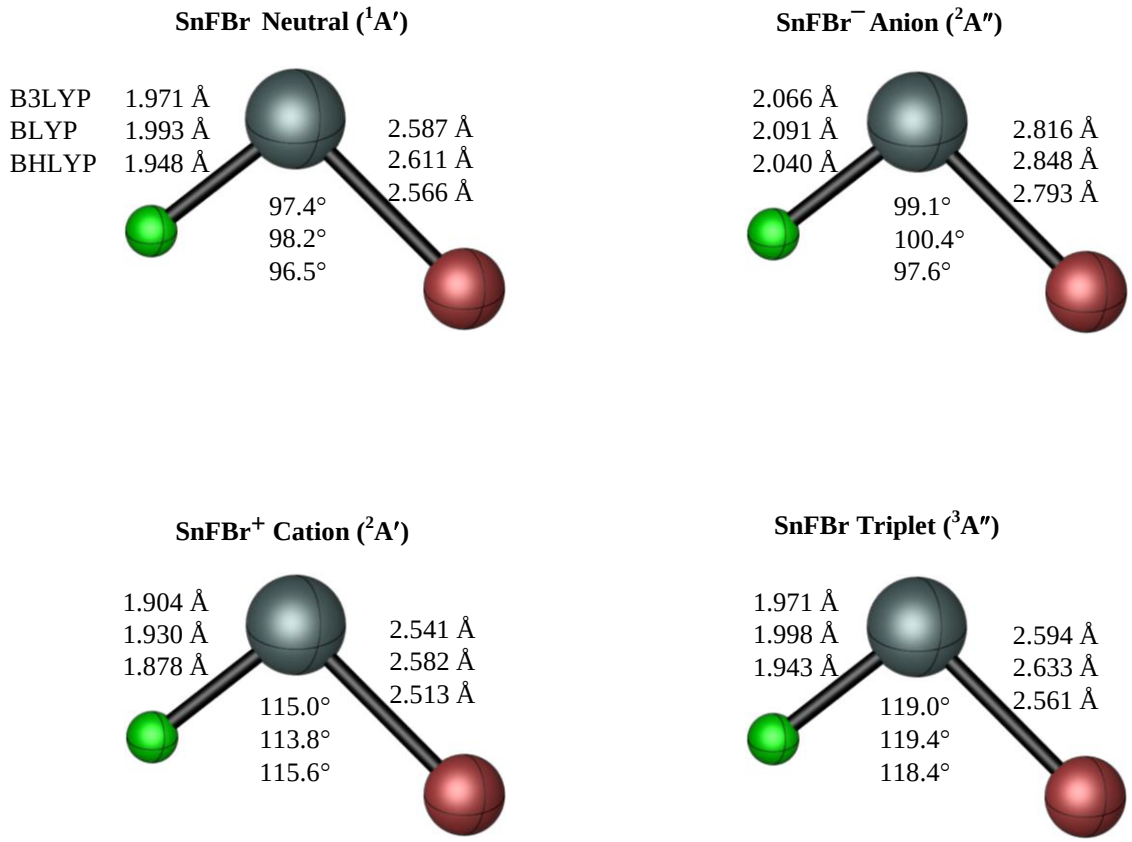


Figure S10. Equilibrium geometries for the $^{1}A'$ ground state of SnFBr, $^{2}A''$ ground state of the $SnFBr^{-}$ anion, $^{2}A'$ ground state of the $SnFBr^{+}$ cation, and $^{3}A''$ excited state of neutral SnFBr.

SnFI

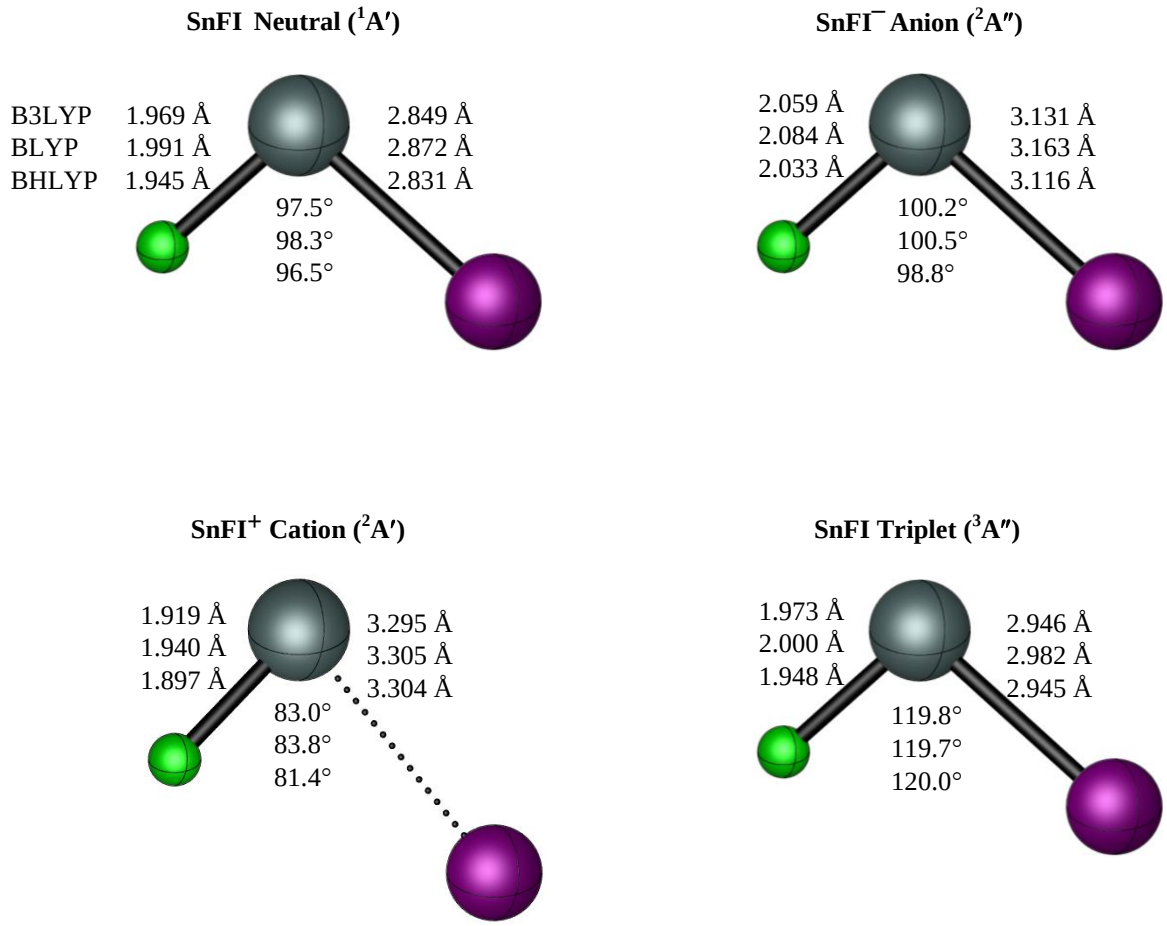


Figure S11. Equilibrium geometries for the $^{1}A'$ ground state of SnFI, $^{2}A''$ ground state of the $SnFI^{-}$ anion, $^{2}A'$ ground state of the $SnFI^{+}$ cation, and $^{3}A''$ excited state of neutral SnFI.

SnClBr

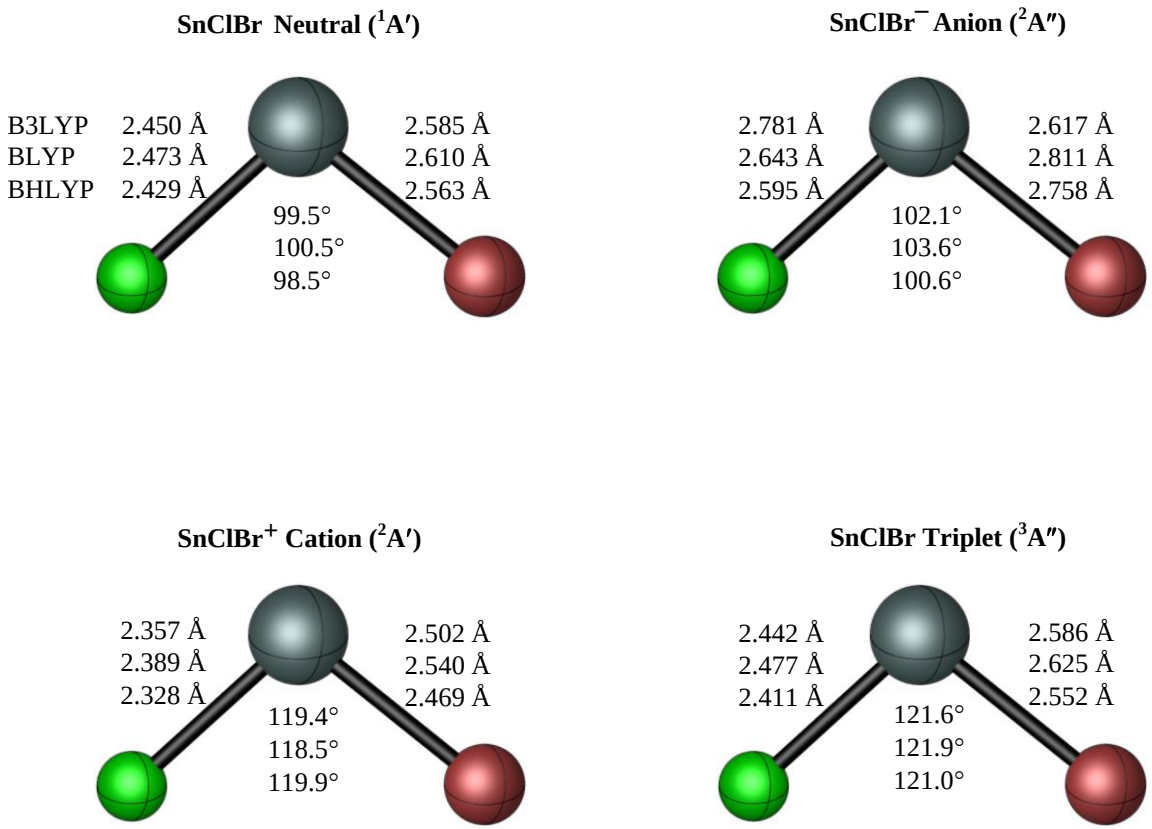
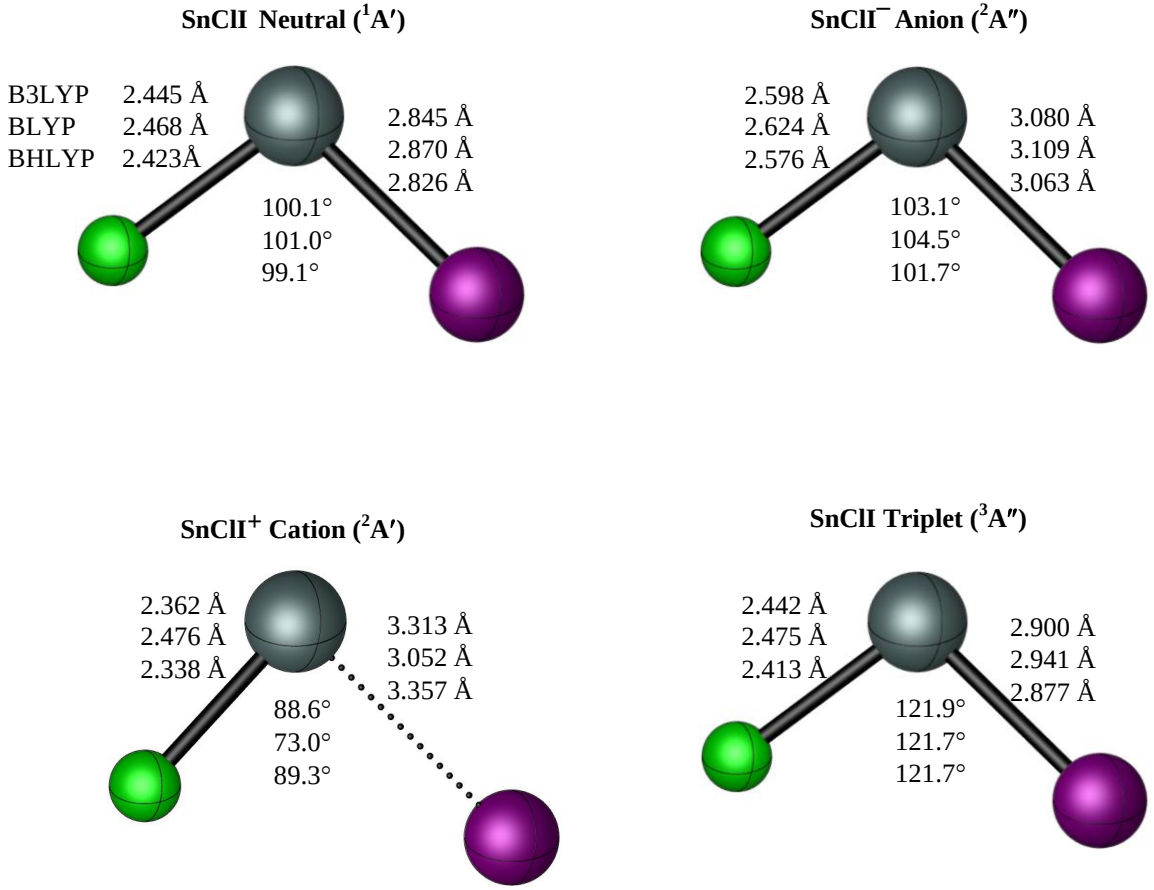


Figure S12. Equilibrium geometries for the $^{1}A'$ ground state of SnClBr, $^{2}A''$ ground state of the $SnClBr^{-}$ anion, $^{2}A'$ ground state of the $SnClBr^{+}$ cation, and $^{3}A''$ excited state of neutral SnClBr.

SnClI



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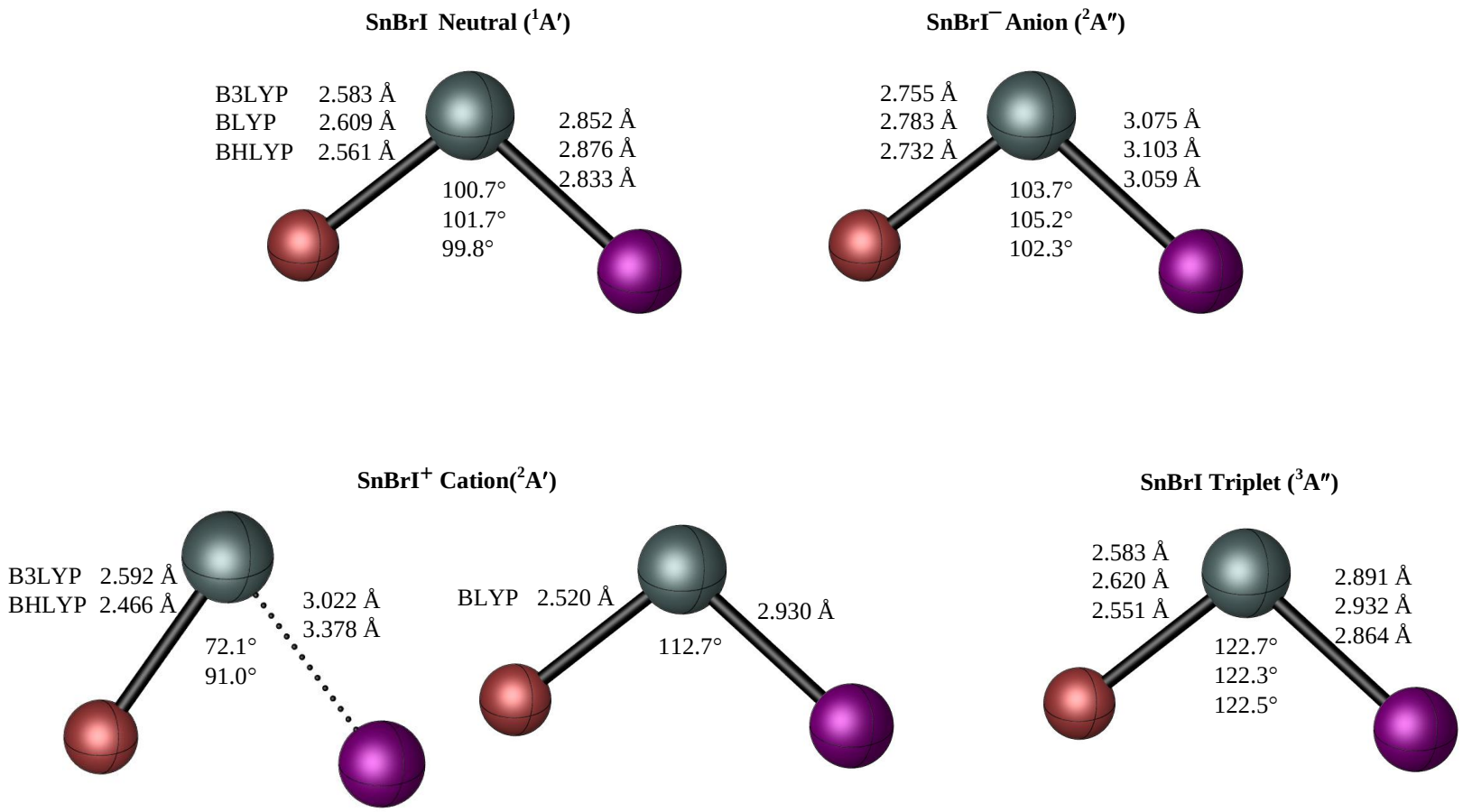
SnBrI



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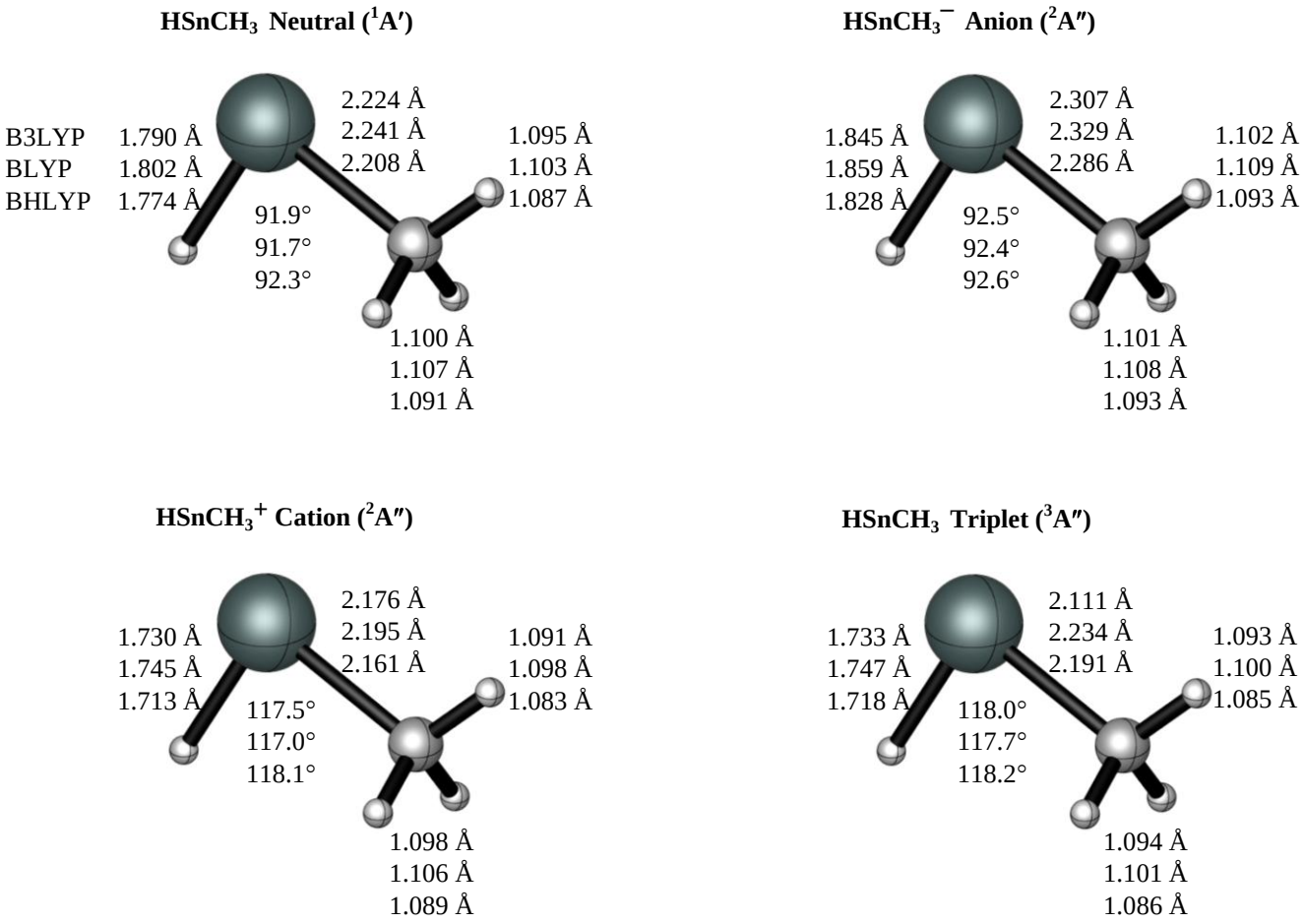
$HSnCH_3$



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$FSnCH_3$

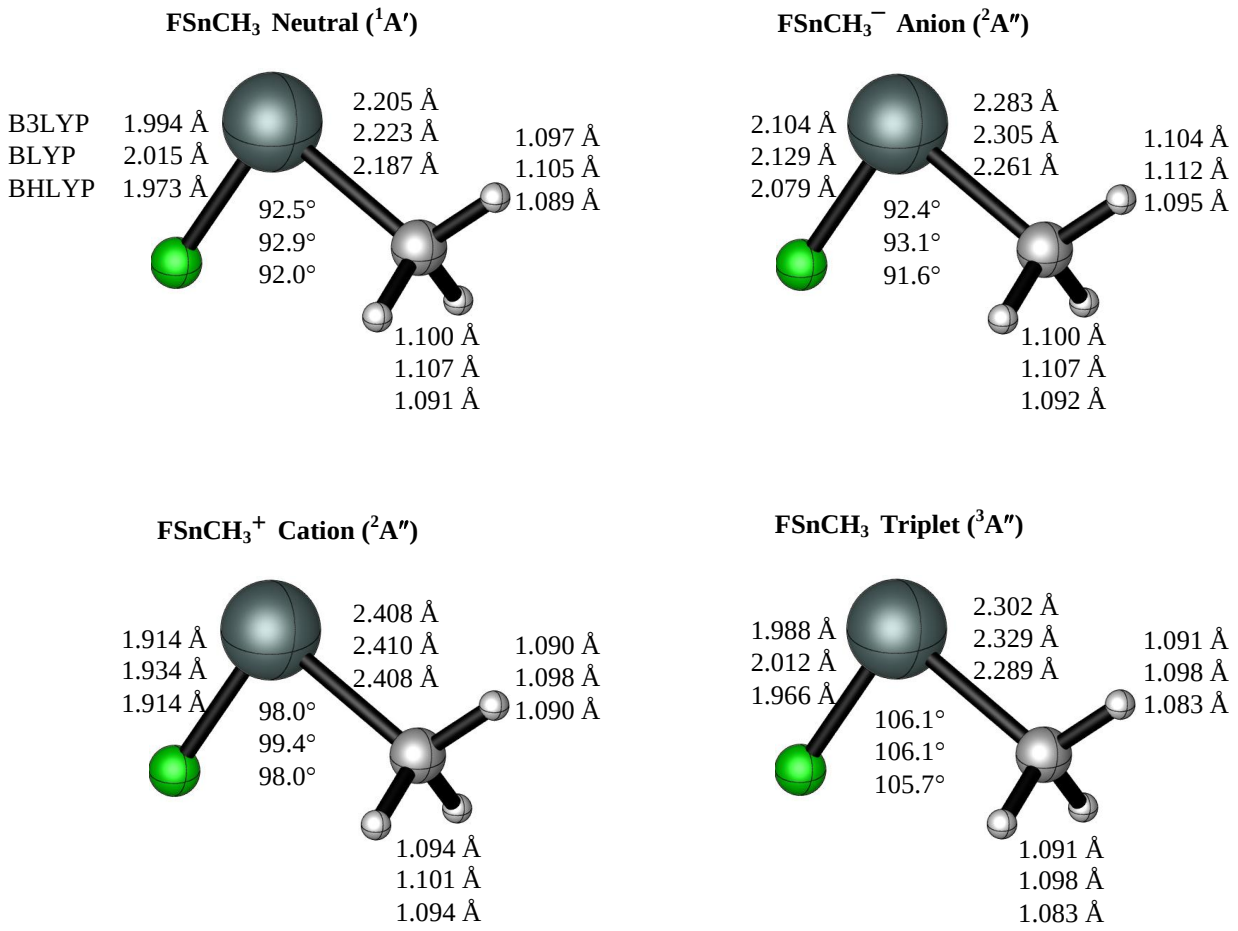

Figure S16. Equilibrium geometries for the $^1A'$ ground state of $FSnCH_3$, $^2A''$ ground state of the $FSnCH_3^-$ anion, $^2A''$ ground state of the $FSnCH_3^+$ cation, and $^3A''$ excited state of neutral $FSnCH_3$.

$ClSnCH_3$

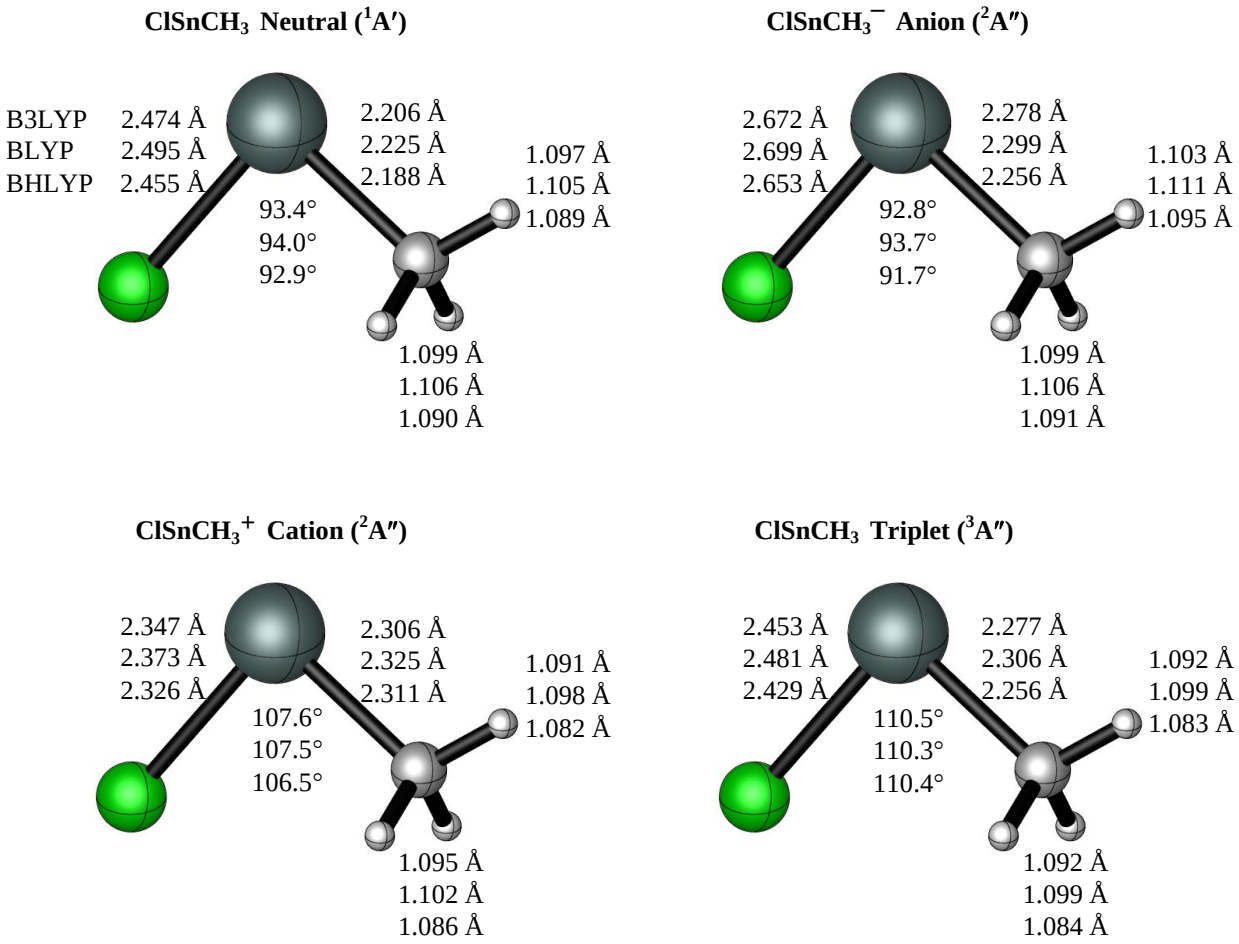

Figure S17. Equilibrium geometries for the $^1A'$ ground state of $ClSnCH_3$, $^2A''$ ground state of the $ClSnCH_3^-$ anion, $^2A''$ ground state of the $ClSnCH_3^+$ cation, and $^3A''$ excited state of neutral $ClSnCH_3$.

$BrSnCH_3$

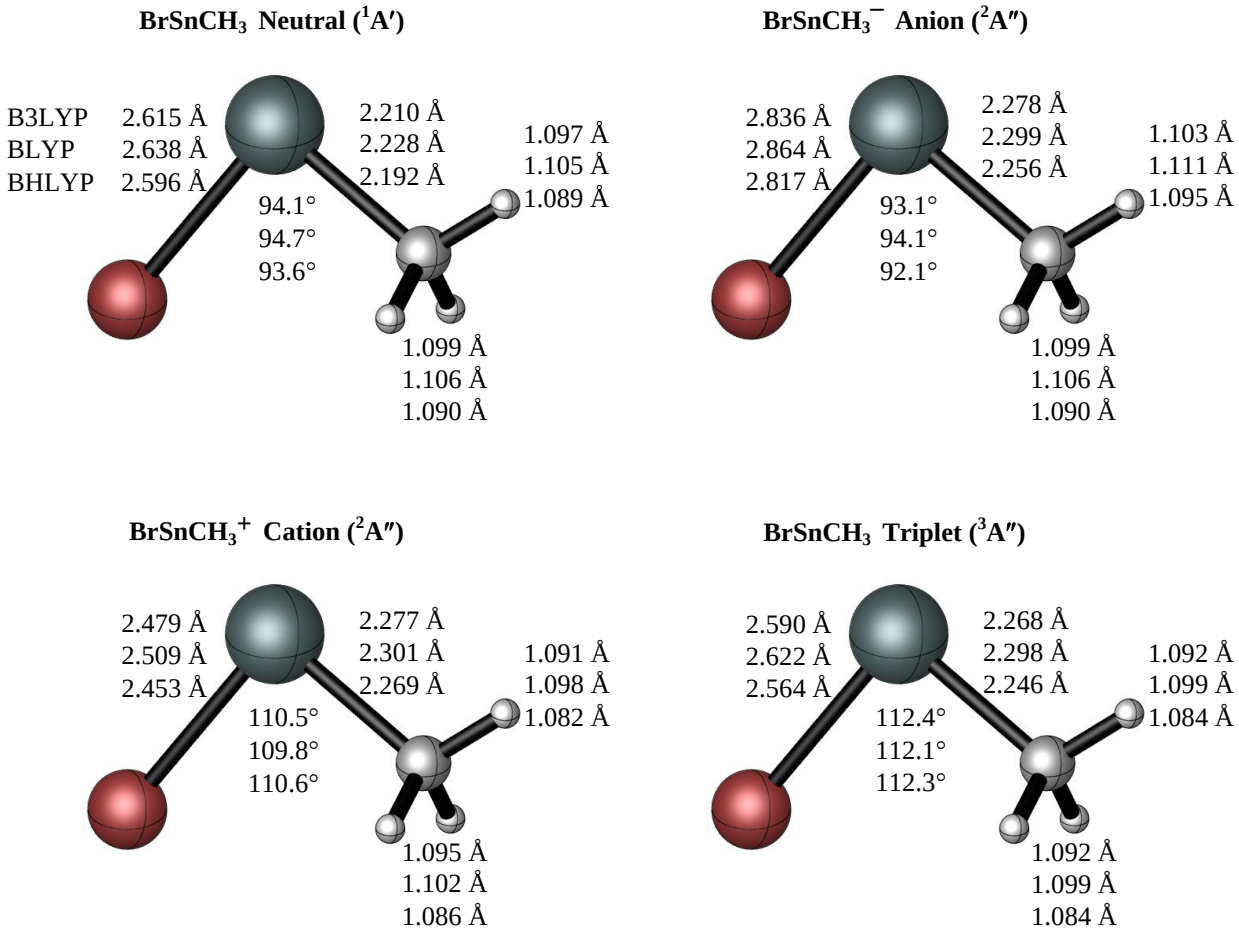

Figure S18. Equilibrium geometries for the $^1A'$ ground state of $BrSnCH_3$, $^2A''$ ground state of the $BrSnCH_3^-$ anion, $^2A''$ ground state of the $BrSnCH_3^+$ cation, and $^3A''$ excited state of neutral $BrSnCH_3$.

$ISnCH_3$

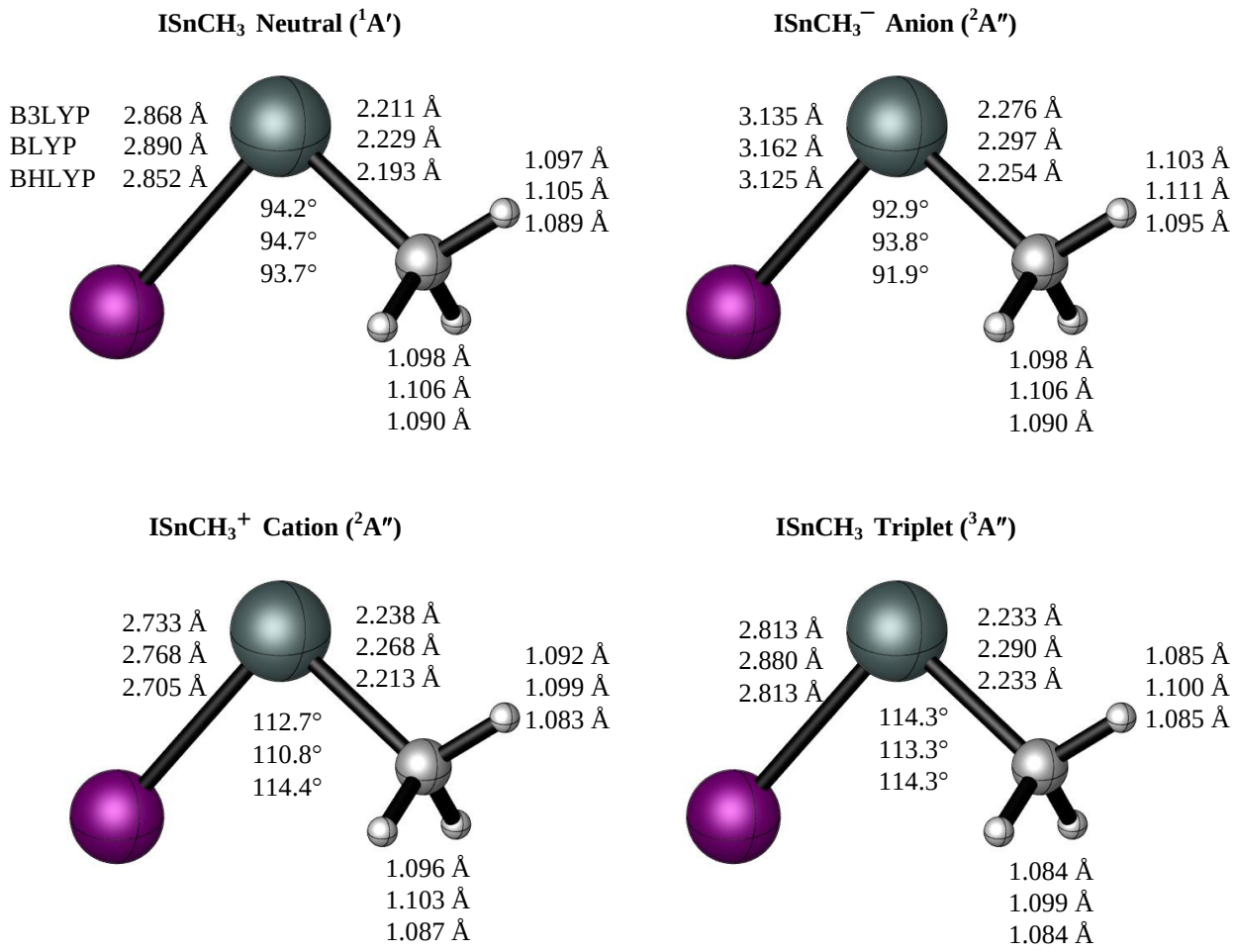

Figure S19. Equilibrium geometries for the $^1A'$ ground state of $ISnCH_3$, $^2A''$ ground state of the $ISnCH_3^-$ anion, $^2A''$ ground state of the $ISnCH_3^+$ cation, and $^3A''$ excited state of neutral $ISnCH_3$.

$HSnSiH_3$

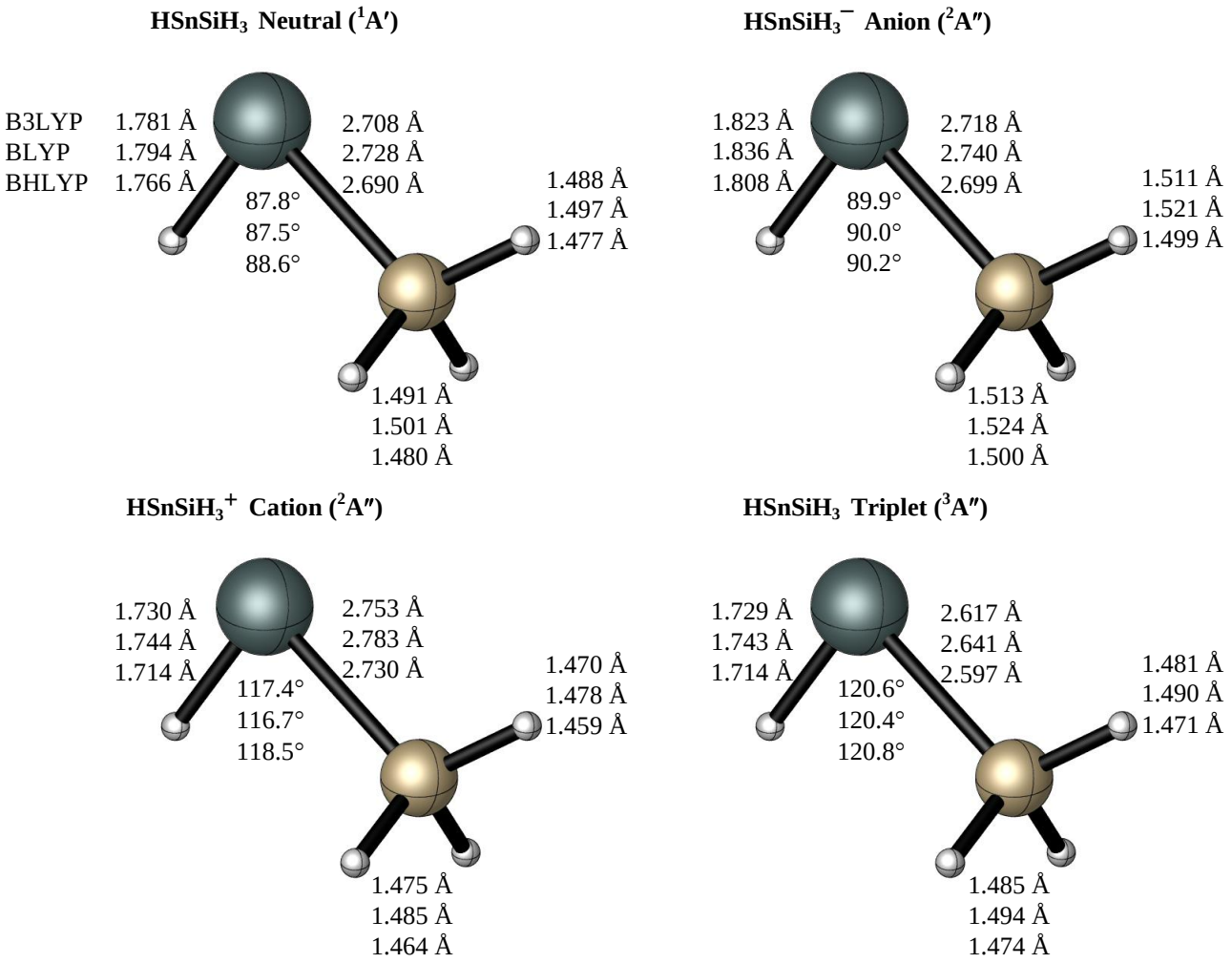

Figure S20. Equilibrium geometries for the $^1A'$ ground state of $HSnSiH_3$, $^2A''$ ground state of the $HSnSiH_3^-$ anion, $^2A''$ ground state of the $HSnSiH_3^+$ cation, and $^3A''$ excited state of neutral $HSnSiH_3$.

$FSnSiH_3$

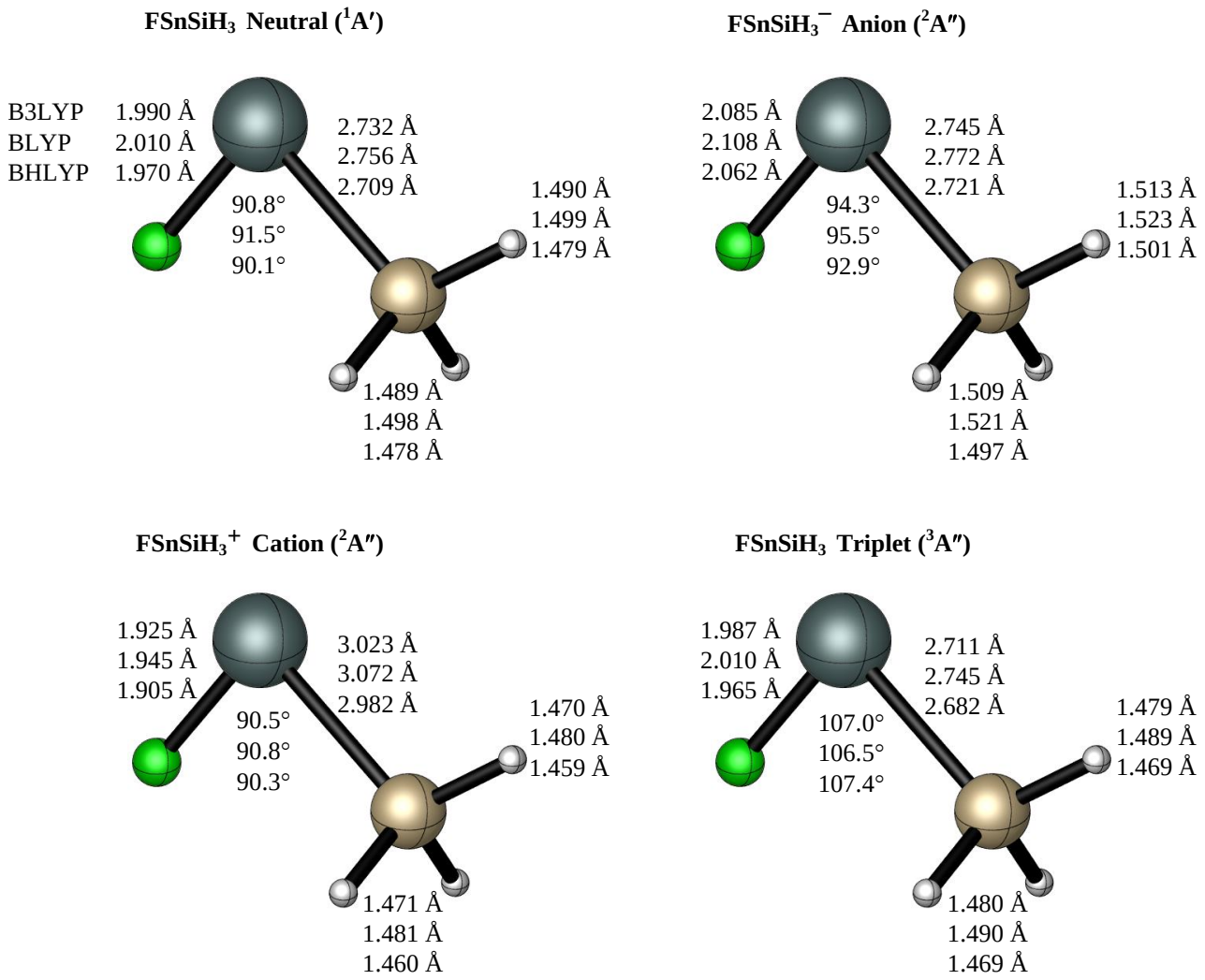

Figure S21. Equilibrium geometries for the $^1A'$ ground state of $FSnSiH_3$, $^2A''$ ground state of the $FSnSiH_3^-$ anion, $^2A''$ ground state of the $FSnSiH_3^+$ cation, and $^3A''$ excited state of neutral $FSnSiH_3$.

$ClSnSiH_3$

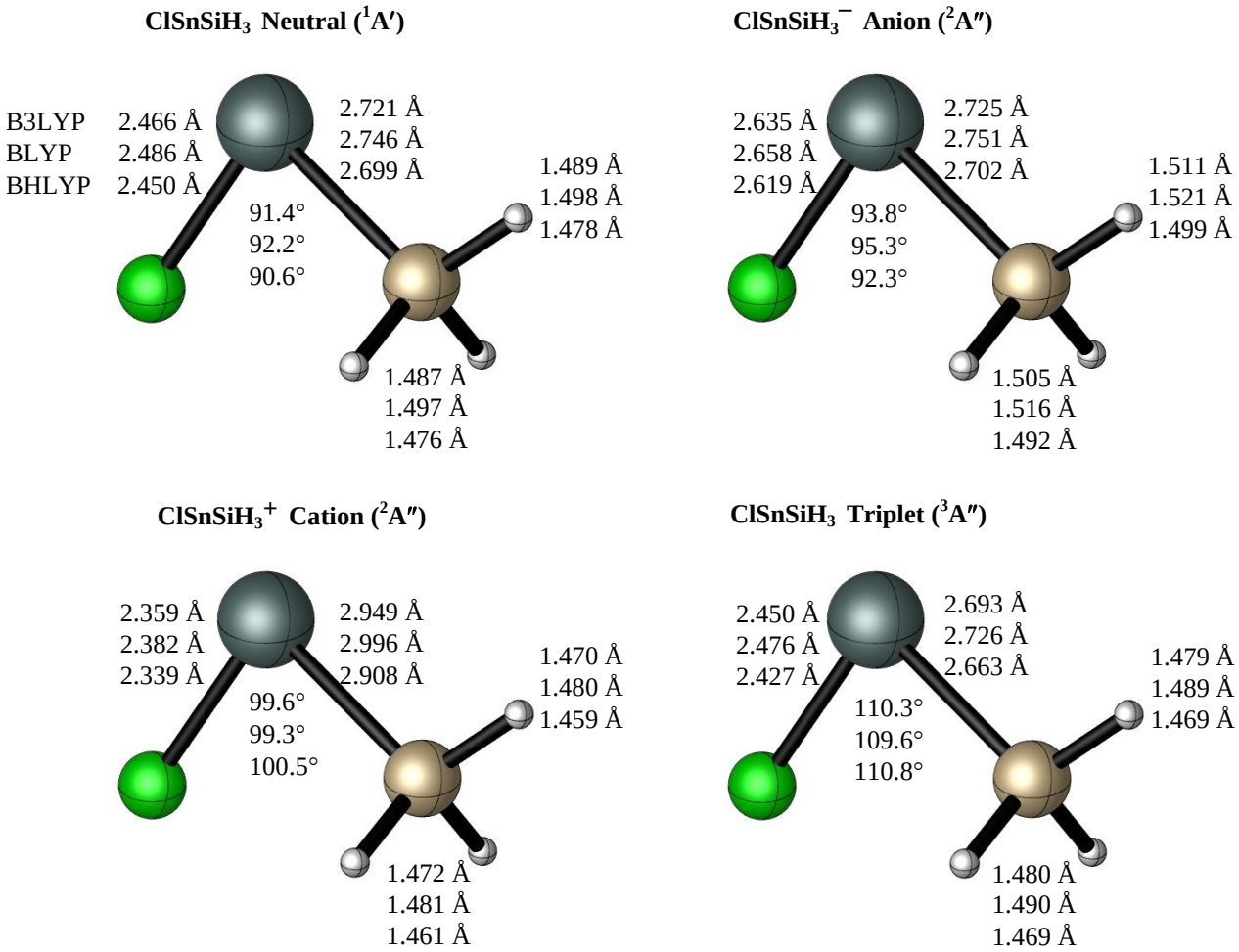

Figure S22. Equilibrium geometries for the $^1A'$ ground state of $ClSnSiH_3$, $^2A''$ ground state of the $ClSnSiH_3^-$ anion, $^2A''$ ground state of the $ClSnSiH_3^+$ cation, and $^3A''$ excited state of neutral $ClSnSiH_3$.

$BrSnSiH_3$

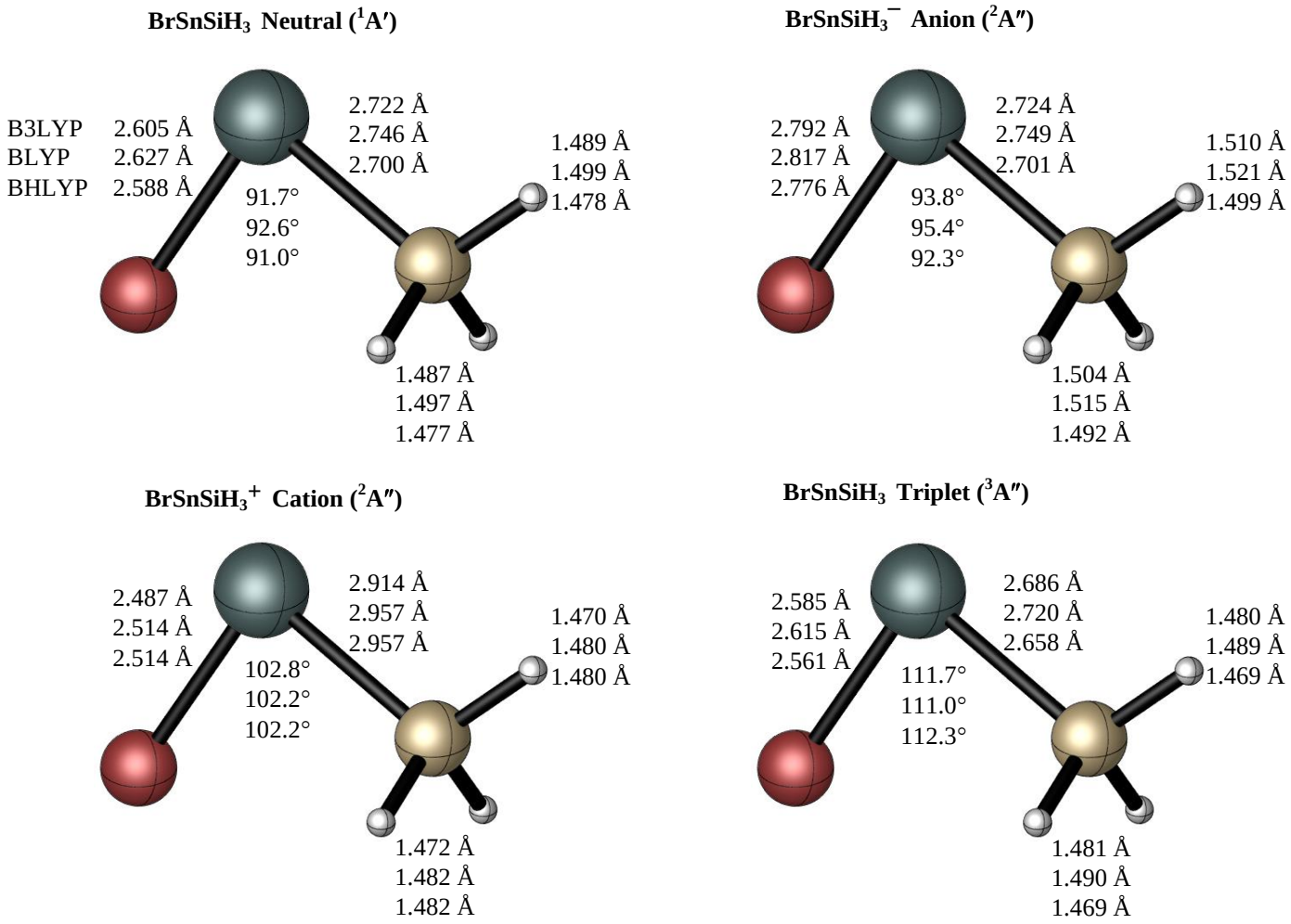

Figure S23. Equilibrium geometries for the $^1A'$ ground state of $BrSnSiH_3$, $^2A''$ ground state of the $BrSnSiH_3^-$ anion, $^2A''$ ground state of the $BrSnSiH_3^+$ cation, and $^3A''$ excited state of neutral $BrSnSiH_3$.

$ISnSiH_3$

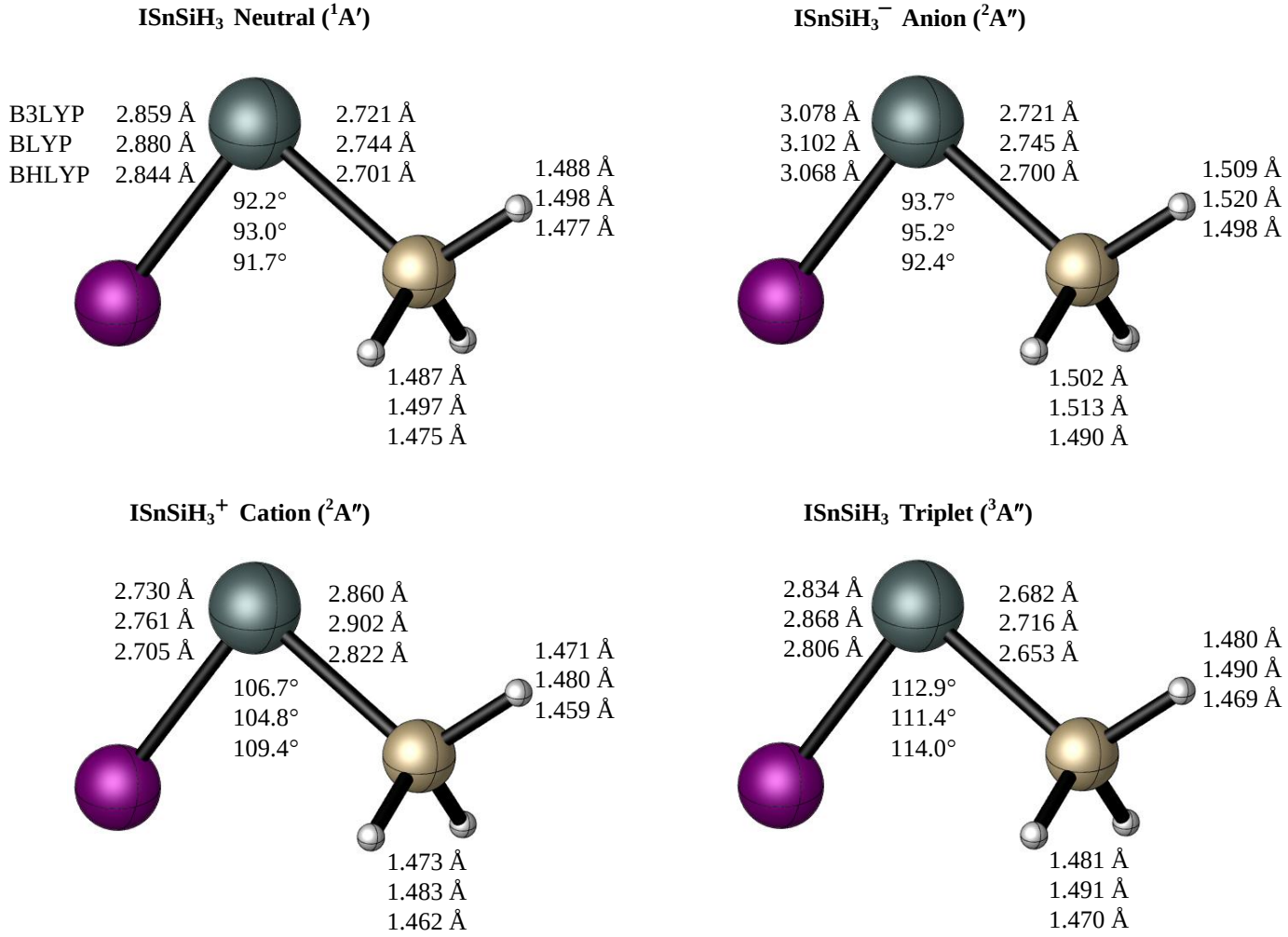

Figure S24. Equilibrium geometries for the $^1A'$ ground state of $ISnSiH_3$, $^2A''$ ground state of the $ISnSiH_3^-$ anion, $^2A''$ ground state of the $ISnSiH_3^+$ cation, and $^3A''$ excited state of neutral $ISnSiH_3$.

$HSnGeH_3$

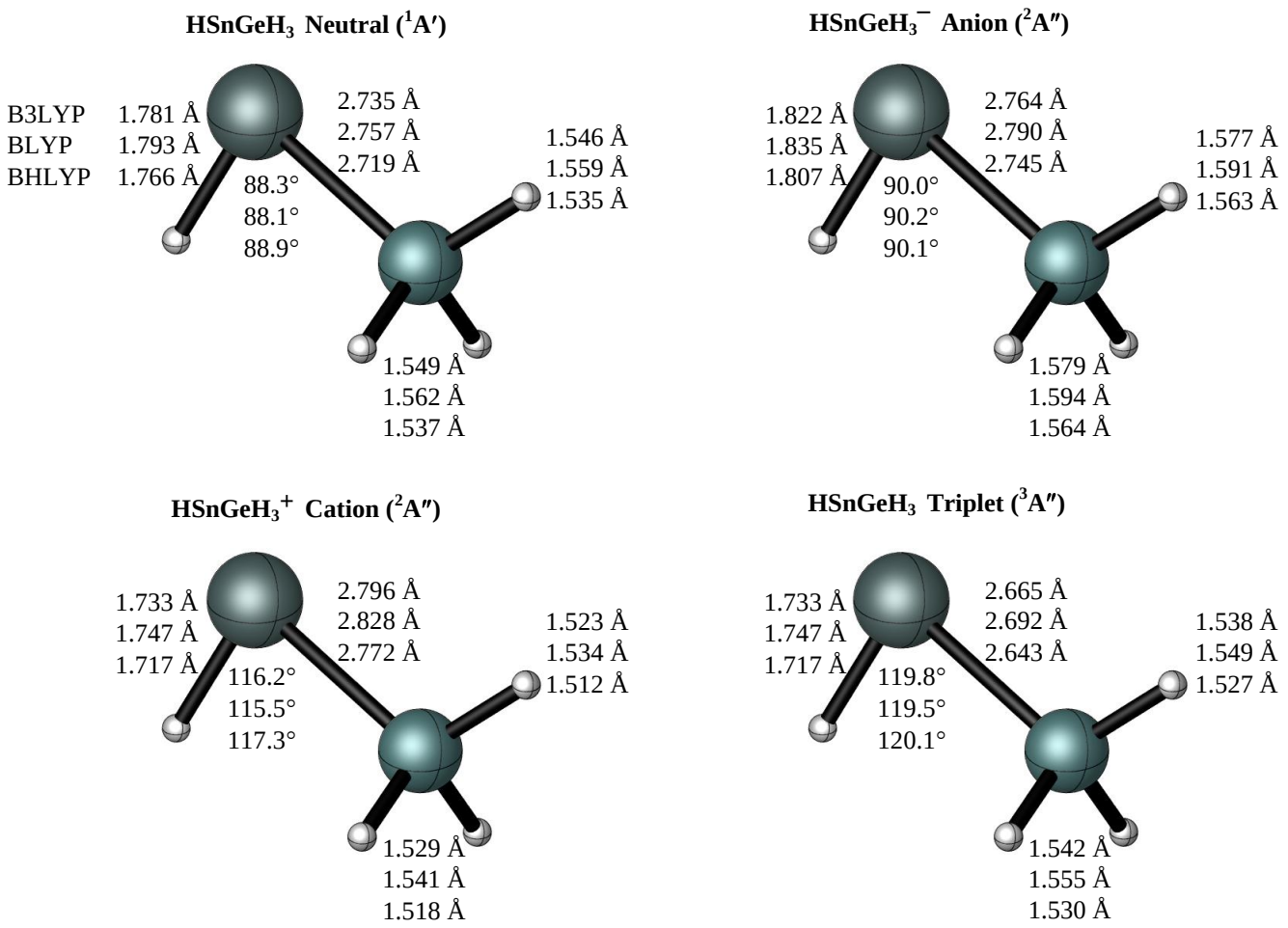

Figure S25. Equilibrium geometries for the $^1A'$ ground state of $HSnGeH_3$, $^2A''$ ground state of the $HSnGeH_3^-$ anion, $^2A''$ ground state of the $HSnGeH_3^+$ cation, and $^3A''$ excited state of neutral $HSnGeH_3$.

$FSnGeH_3$

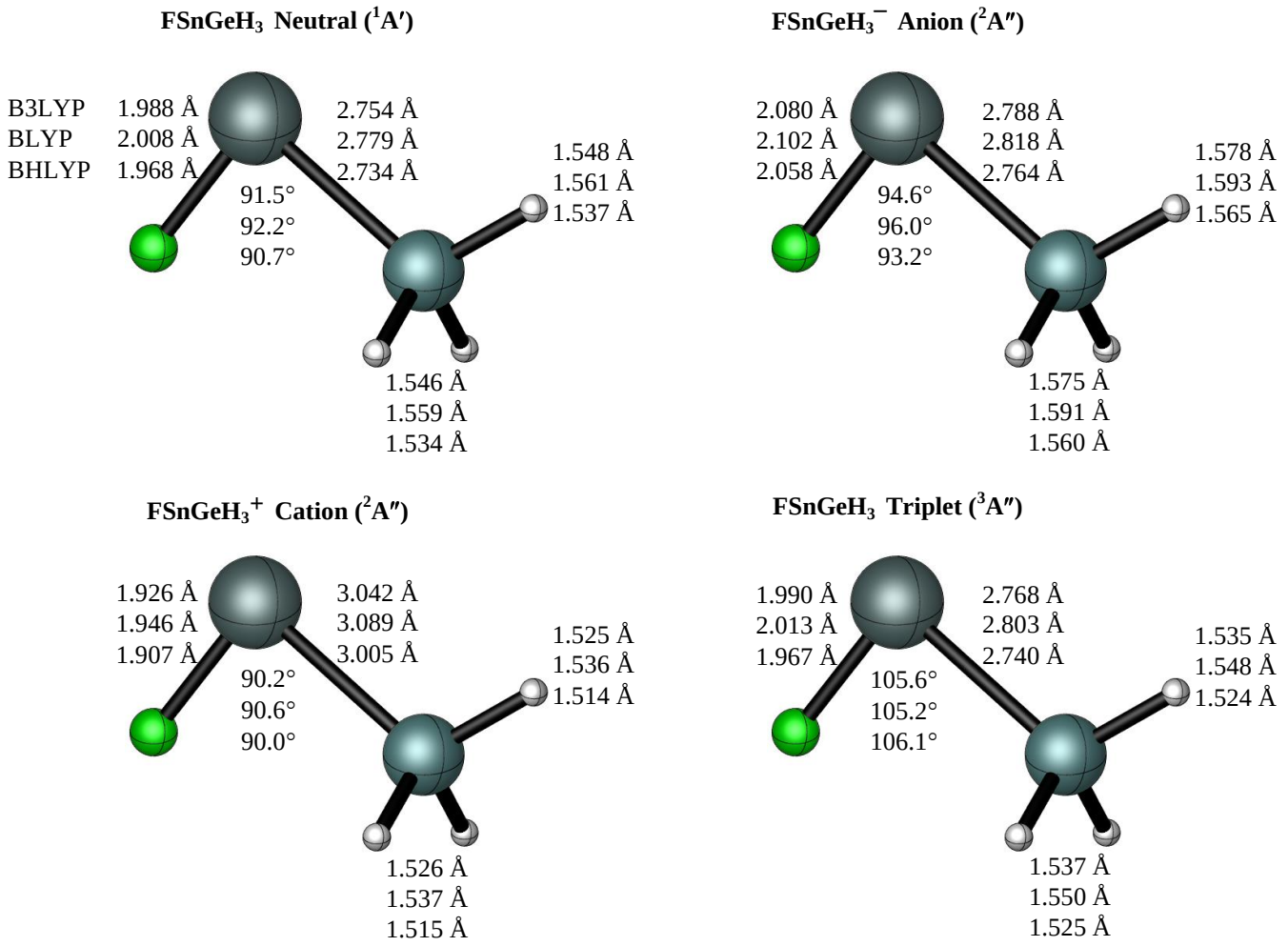

Figure S26. Equilibrium geometries for the $^1A'$ ground state of $FSnGeH_3$, $^2A''$ ground state of the $FSnGeH_3^-$ anion, $^2A''$ ground state of the $FSnGeH_3^+$ cation, and $^3A''$ excited state of neutral $FSnGeH_3$.

$ClSnGeH_3$

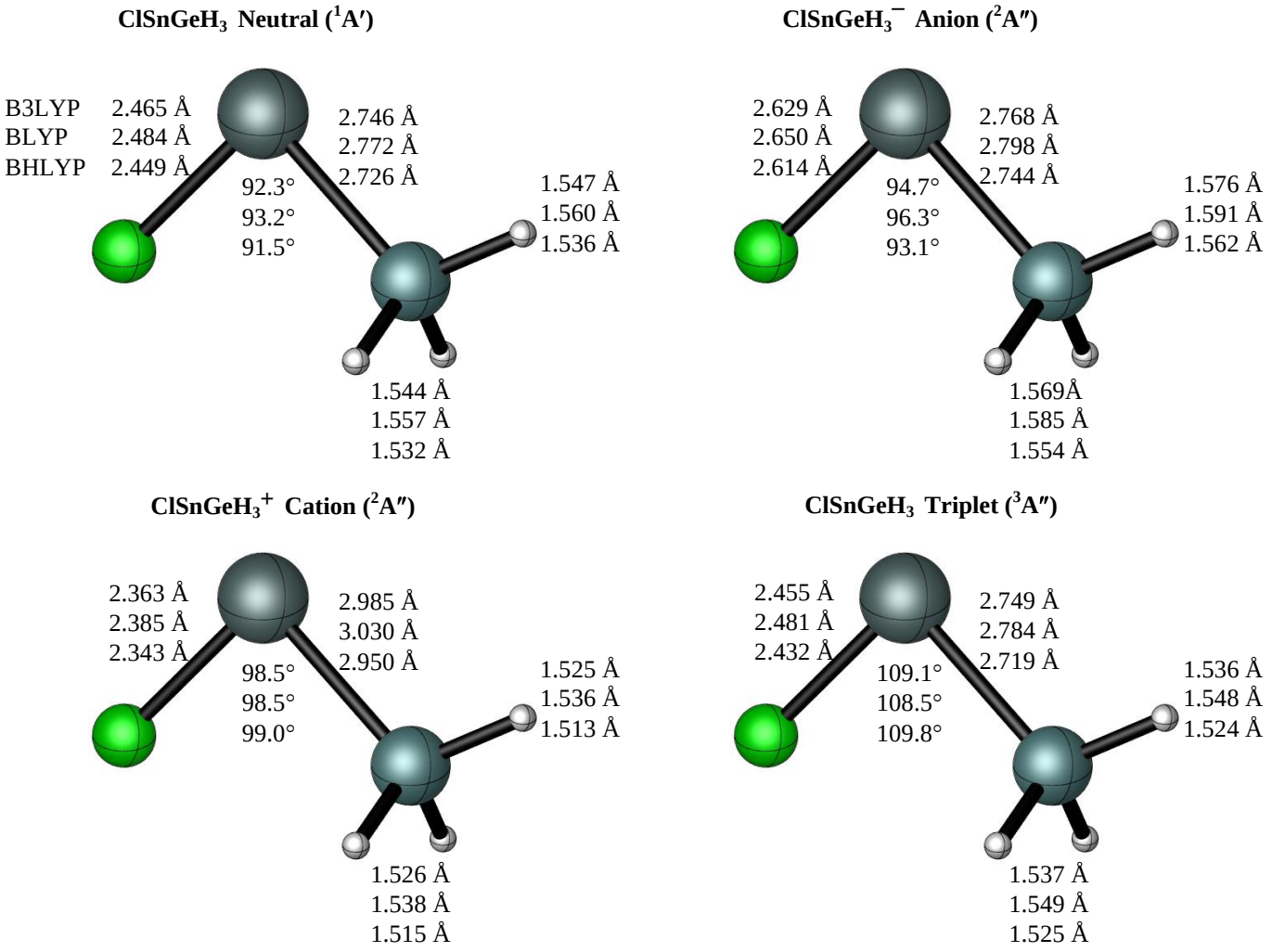

Figure S27. Equilibrium geometries for the $^1A'$ ground state of $ClSnGeH_3$, $^2A''$ ground state of the $ClSnGeH_3^-$ anion, $^2A''$ ground state of the $ClSnGeH_3^+$ cation, and $^3A''$ excited state of neutral $ClSnGeH_3$.

$BrSnGeH_3$

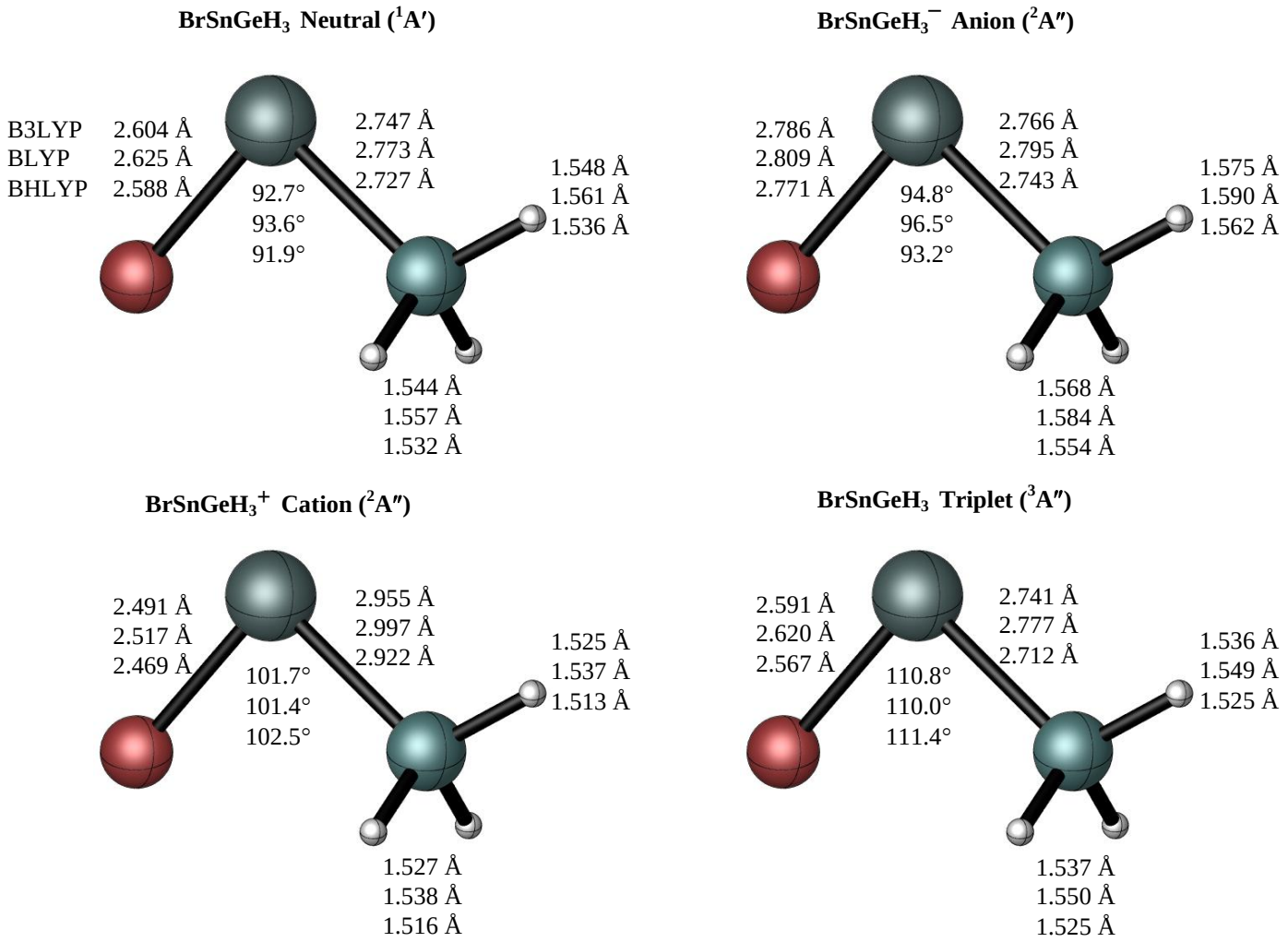

Figure S28. Equilibrium geometries for the $^1A'$ ground state of $BrSnGeH_3$, $^2A''$ ground state of the $BrSnGeH_3^-$ anion, $^2A''$ ground state of the $BrSnGeH_3^+$ cation, and $^3A''$ excited state of neutral $BrSnGeH_3$.

$ISnGeH_3$

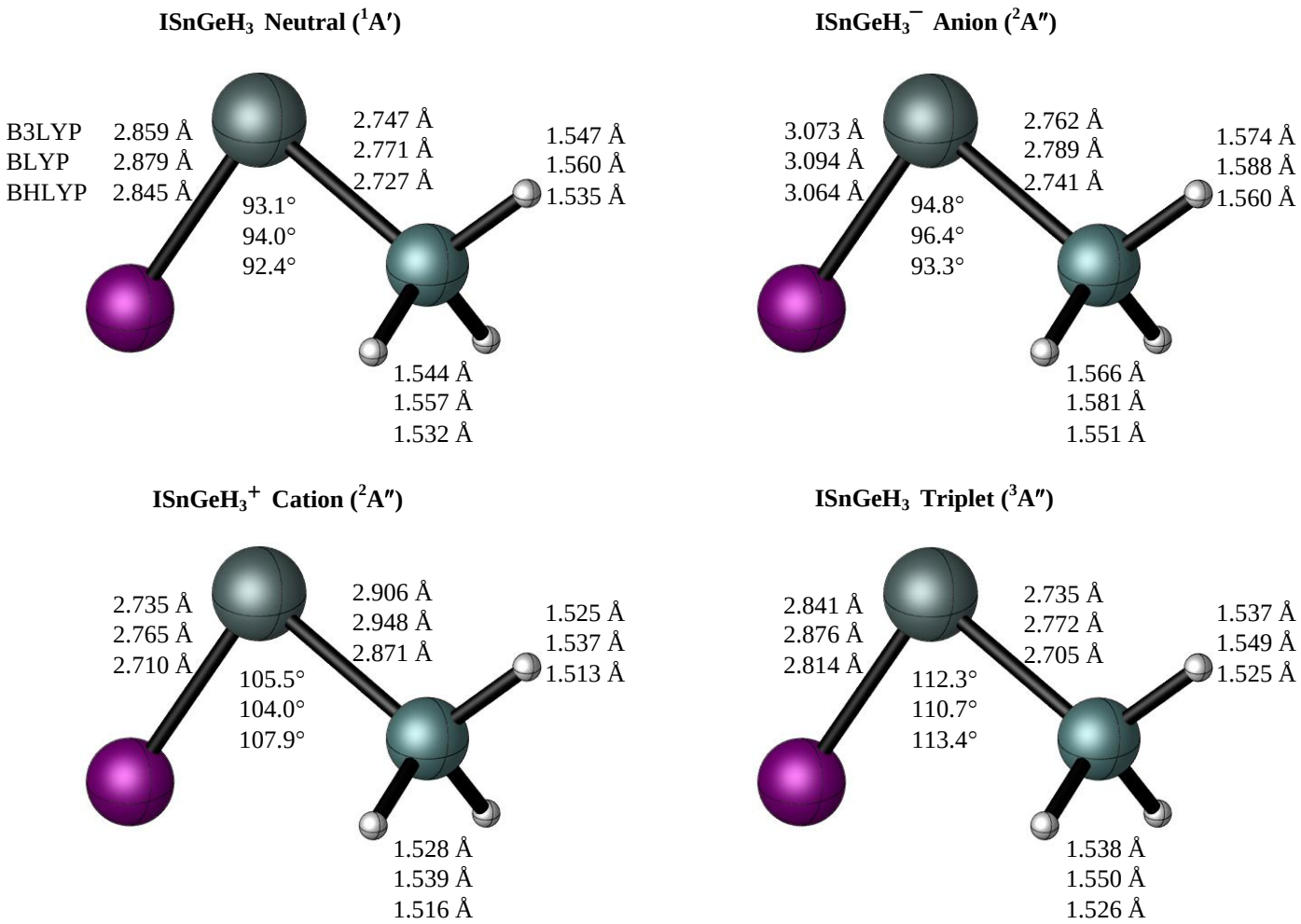

Figure S29. Equilibrium geometries for the $^1A'$ ground state of $ISnGeH_3$, $^2A''$ ground state of the $ISnGeH_3^-$ anion, $^2A''$ ground state of the $ISnGeH_3^+$ cation, and $^3A''$ excited state of neutral $ISnGeH_3$.

$FSnSnH_3$

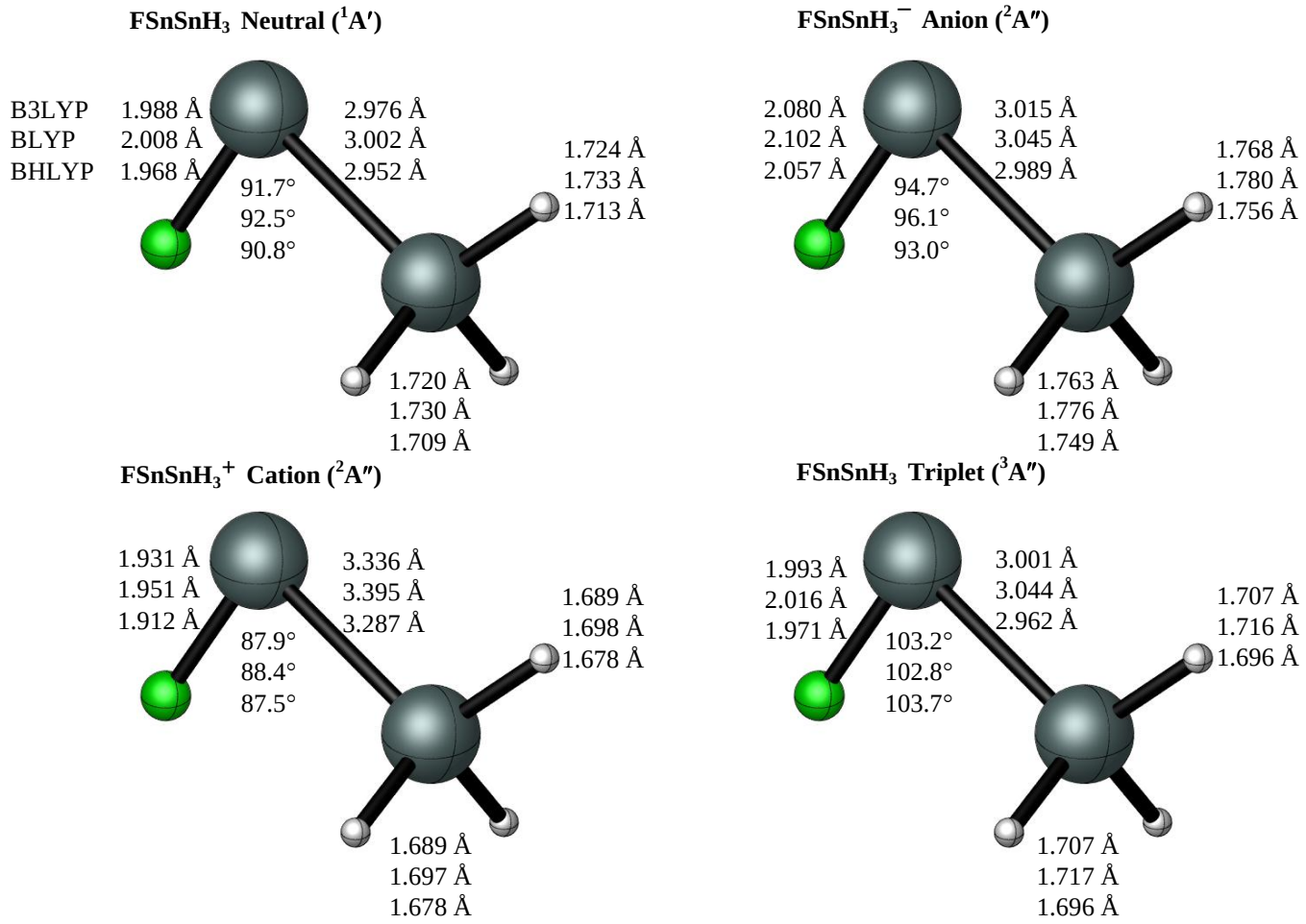

Figure S30. Equilibrium geometries for the $^1A'$ ground state of $FSnSnH_3$, $^2A''$ ground state of the $FSnSnH_3^-$ anion, $^2A''$ ground state of the $FSnSnH_3^+$ cation, and $^3A''$ excited state of neutral $FSnSnH_3$.

$ClSnSnH_3$

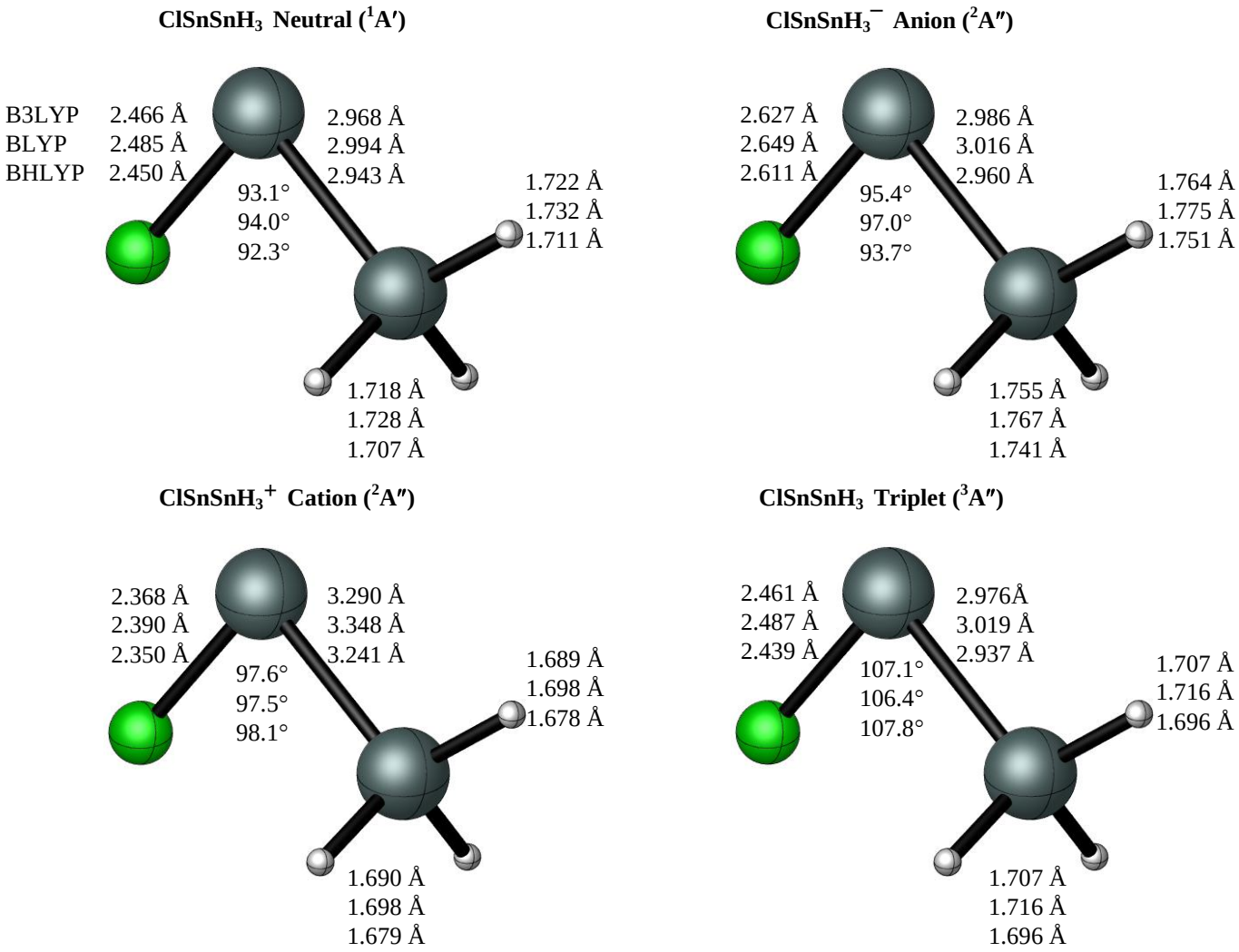

Figure S31. Equilibrium geometries for the $^1A'$ ground state of $ClSnSnH_3$, $^2A''$ ground state of the $ClSnSnH_3^-$ anion, $^2A''$ ground state of the $ClSnSnH_3^+$ cation, and $^3A''$ excited state of neutral $ClSnSnH_3$.

$BrSnSnH_3$

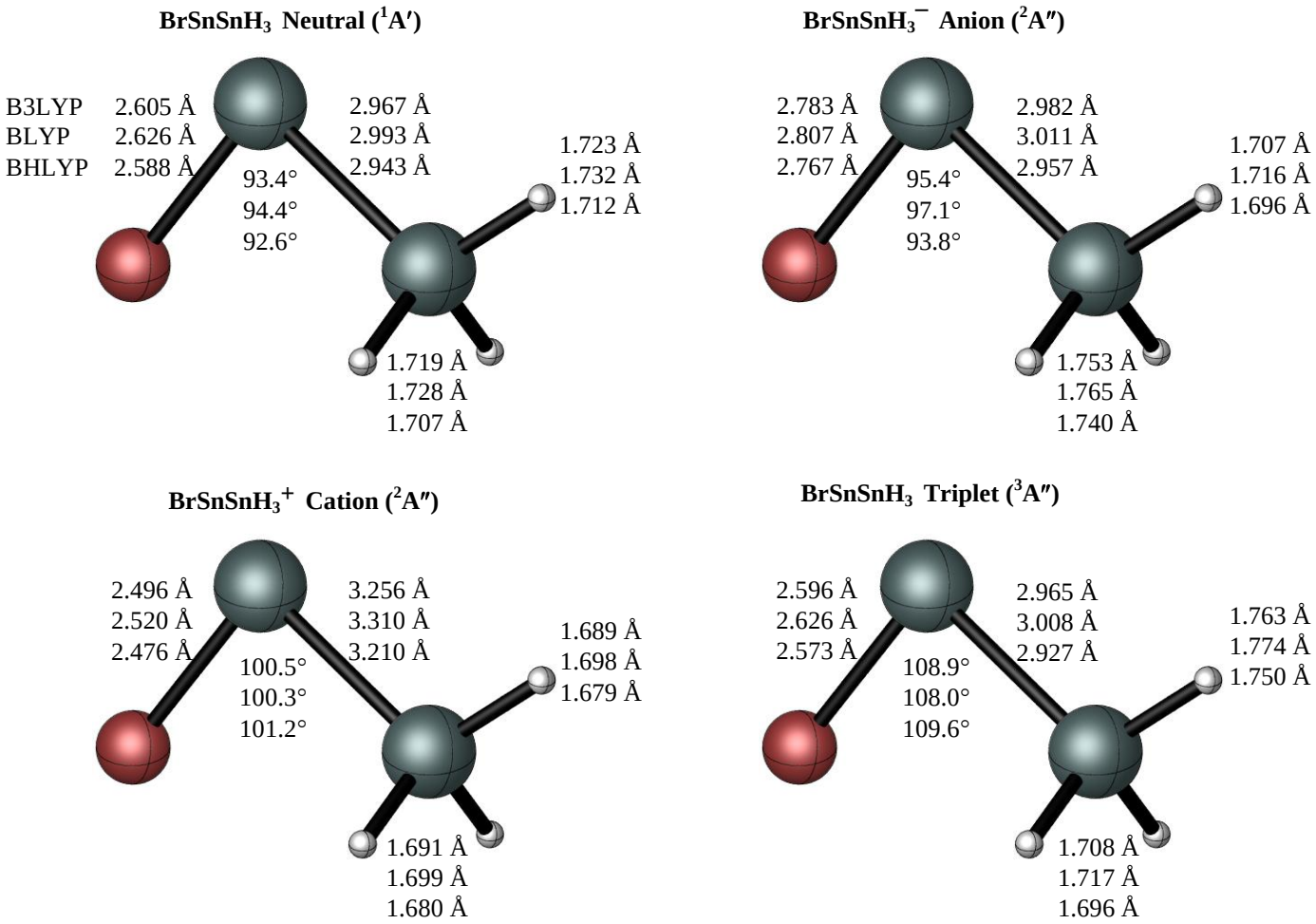

Figure S32. Equilibrium geometries for the $^1A'$ ground state of $BrSnSnH_3$, $^2A''$ ground state of the $BrSnSnH_3^-$ anion, $^2A''$ ground state of the $BrSnSnH_3^+$ cation, and $^3A''$ excited state of neutral $BrSnSnH_3$.

$ISnSnH_3$

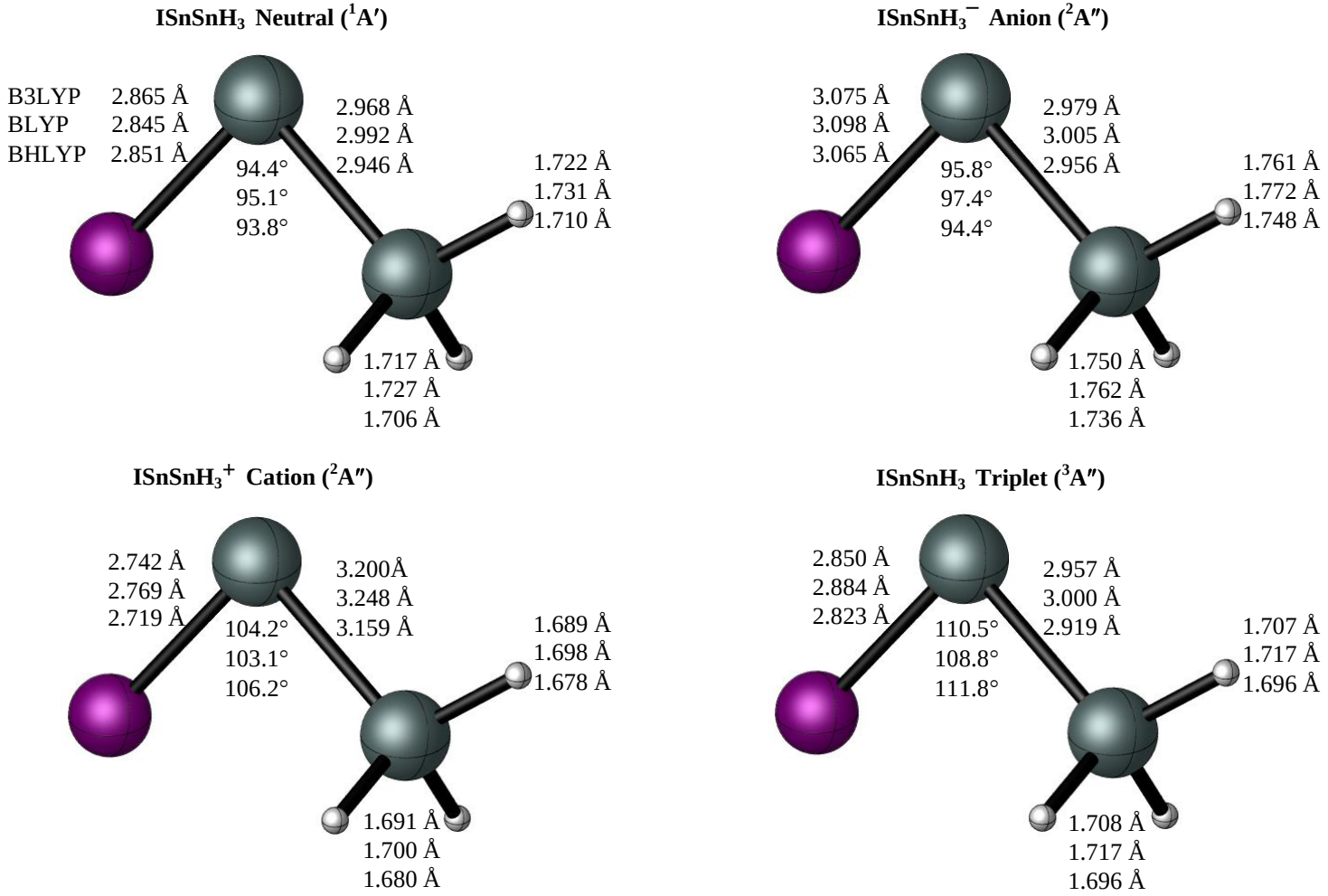

Figure S33. Equilibrium geometries for the $^1A'$ ground state of $ISnSnH_3$, $^2A''$ ground state of the $ISnSnH_3^-$ anion, $^2A''$ ground state of the $ISnSnH_3^+$ cation, and $^3A''$ excited state of neutral $ISnSnH_3$.

$Sn(SiH_3)_2$

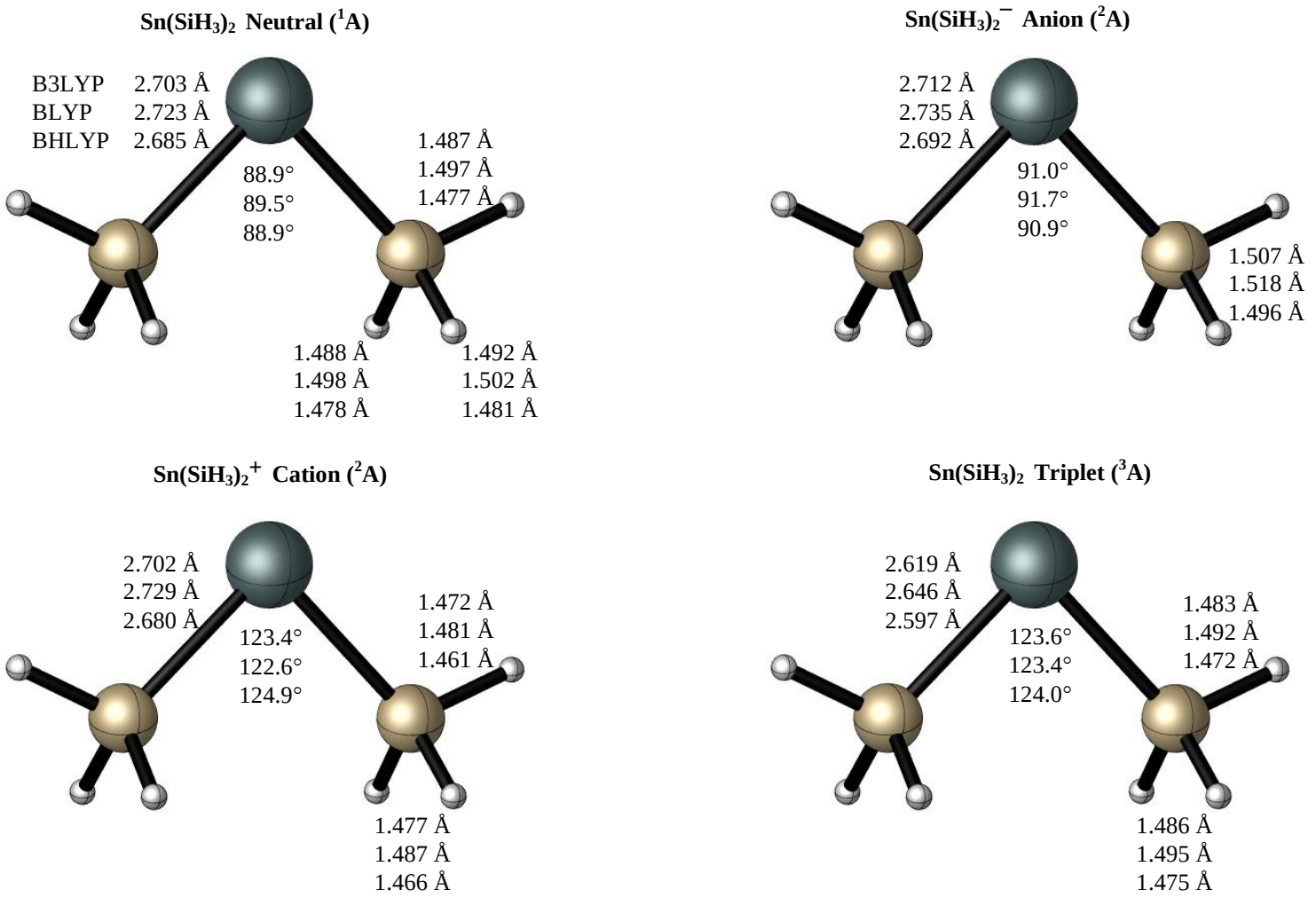

Figure S34. Equilibrium geometries for the ^{1}A ground state of $Sn(SiH_3)_2$, ^{2}A ground state of the $Sn(SiH_3)_2^-$ anion, ^{2}A ground state of the $Sn(SiH_3)_2^+$ cation, and ^{3}A excited state of neutral $Sn(SiH_3)_2$.

$Sn(GeH_3)_2$

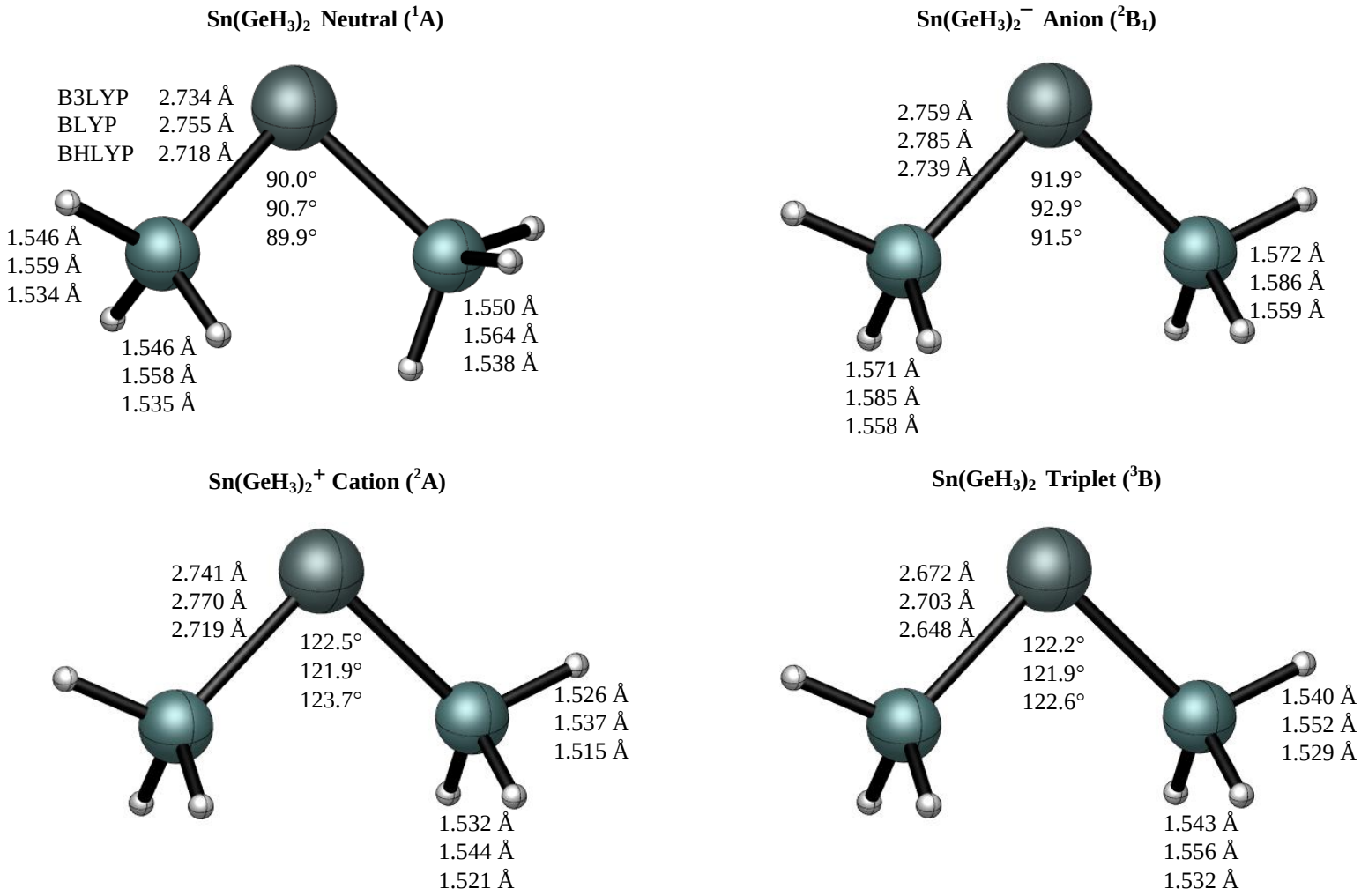

Figure S35. Equilibrium geometries for the ^{1}A ground state of $Sn(GeH_3)_2$, ^{2}A ground state of the $Sn(GeH_3)_2^-$ anion, ^{2}A ground state of the $Sn(GeH_3)_2^+$ cation, and ^{3}A excited state of neutral $Sn(GeH_3)_2$.

$Sn(SnH_3)_2$

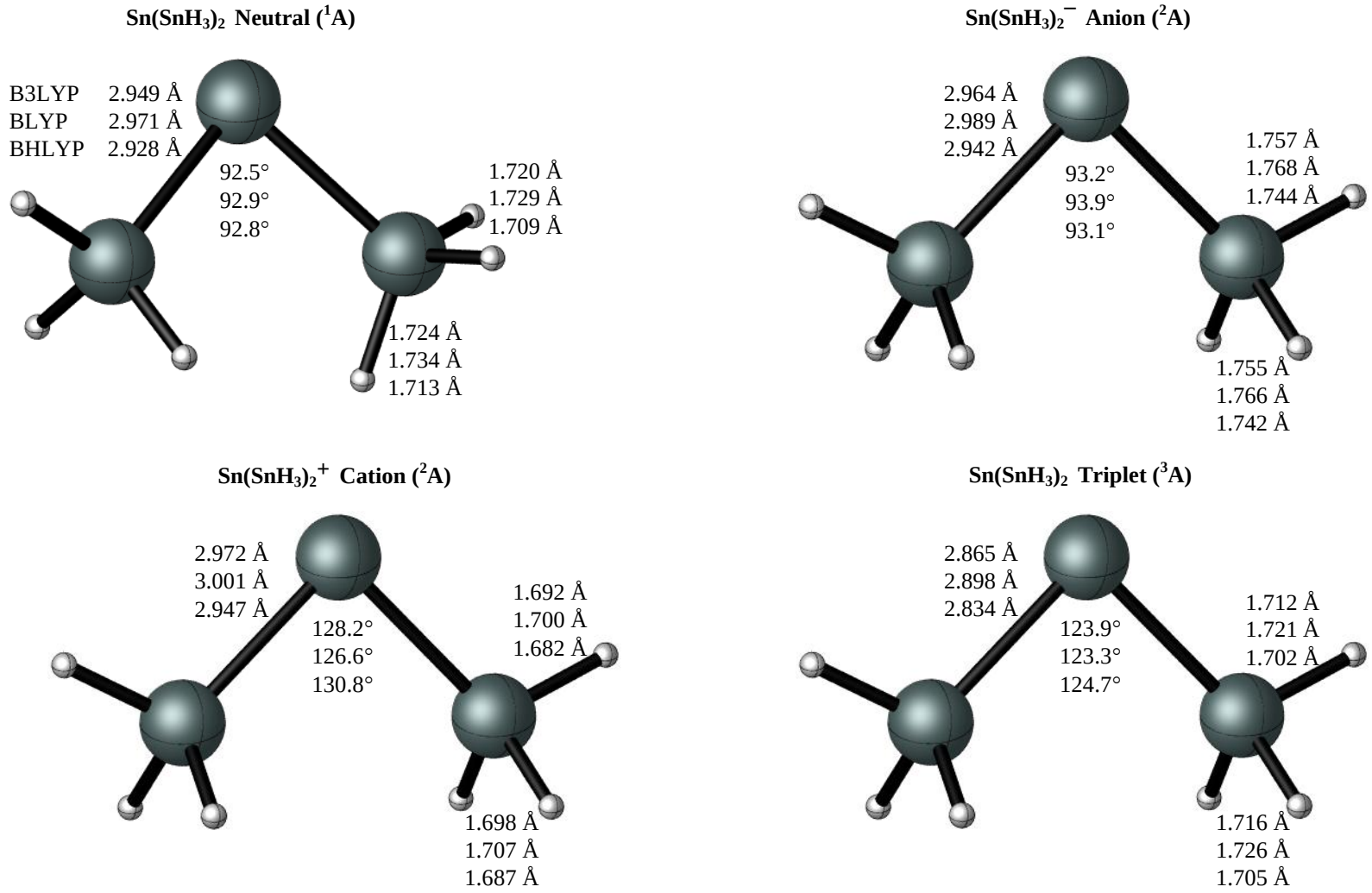

Figure S36. Equilibrium geometries for the ^1A ground state of $Sn(SnH_3)_2$, ^2A ground state of the $Sn(SnH_3)_2^-$ anion, ^2A ground state of the $Sn(SnH_3)_2^+$ cation, and ^3A excited state of neutral $Sn(SnH_3)_2$.

CH_3SnSiH_3

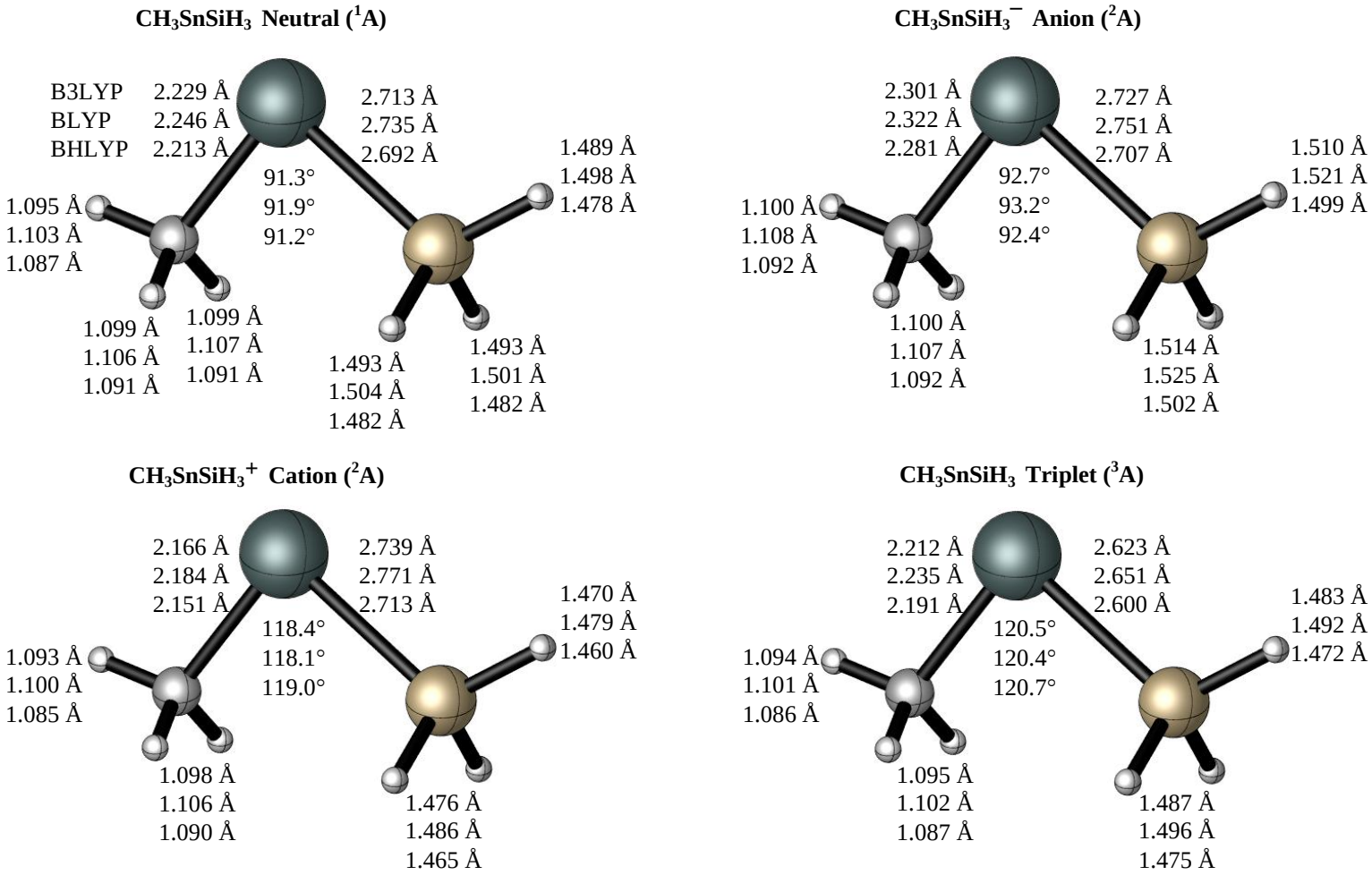

Figure S37. Equilibrium geometries for the ^{1}A ground state of CH_3SnSiH_3, ^{2}A ground state of the $CH_3SnSiH_3^-$ anion, ^{2}A ground state of the $CH_3SnSiH_3^+$ cation, and ^{3}A excited state of neutral CH_3SnSiH_3.

CH_3SnGeH_3

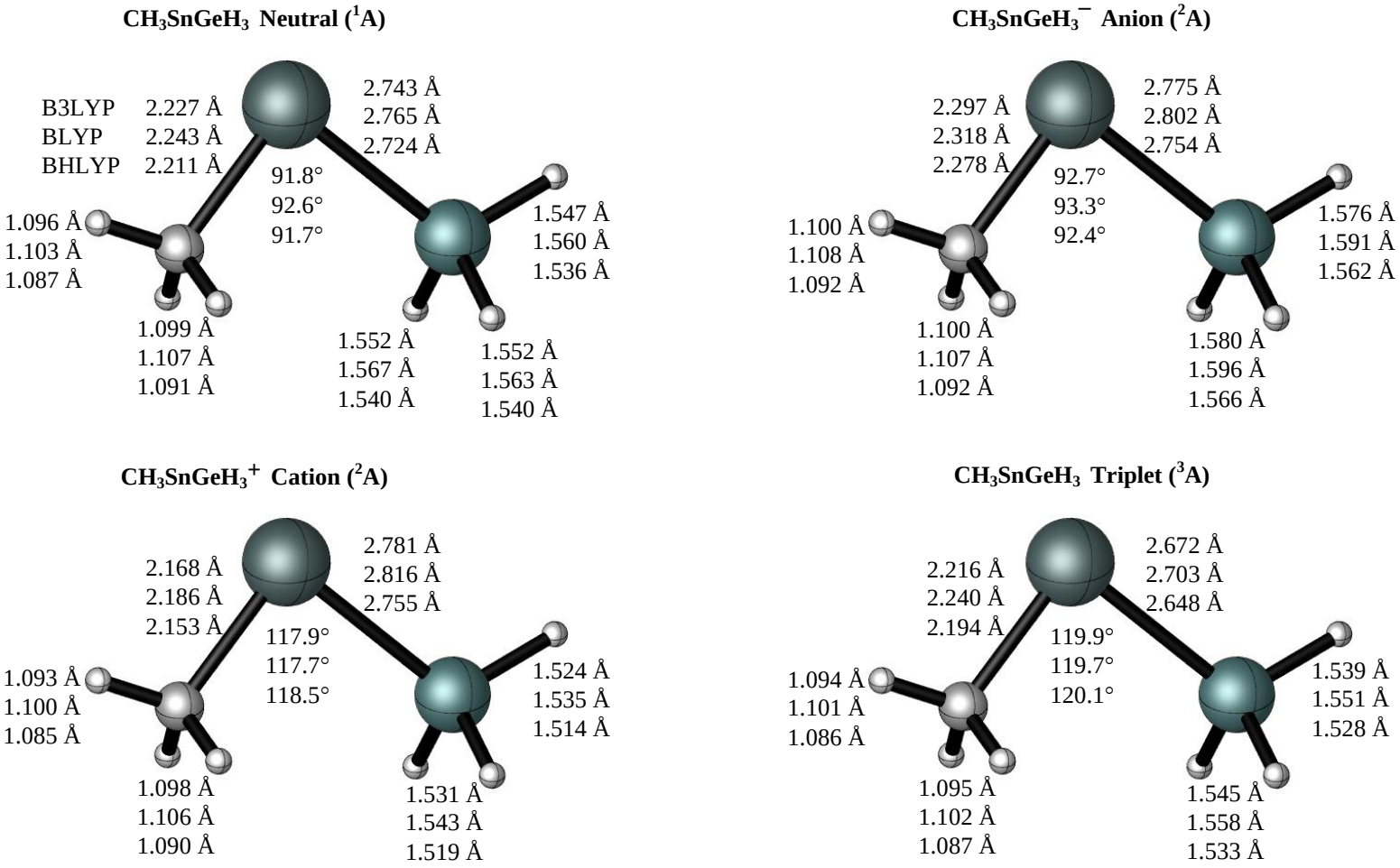

Figure S38. Equilibrium geometries for the ^{1}A ground state of CH_3SnGeH_3, ^{2}A ground state of the $CH_3SnGeH_3^-$ anion, ^{2}A ground state of the $CH_3SnGeH_3^+$ cation, and ^{3}A excited state of neutral CH_3SnGeH_3.

CH_3SnSnH_3

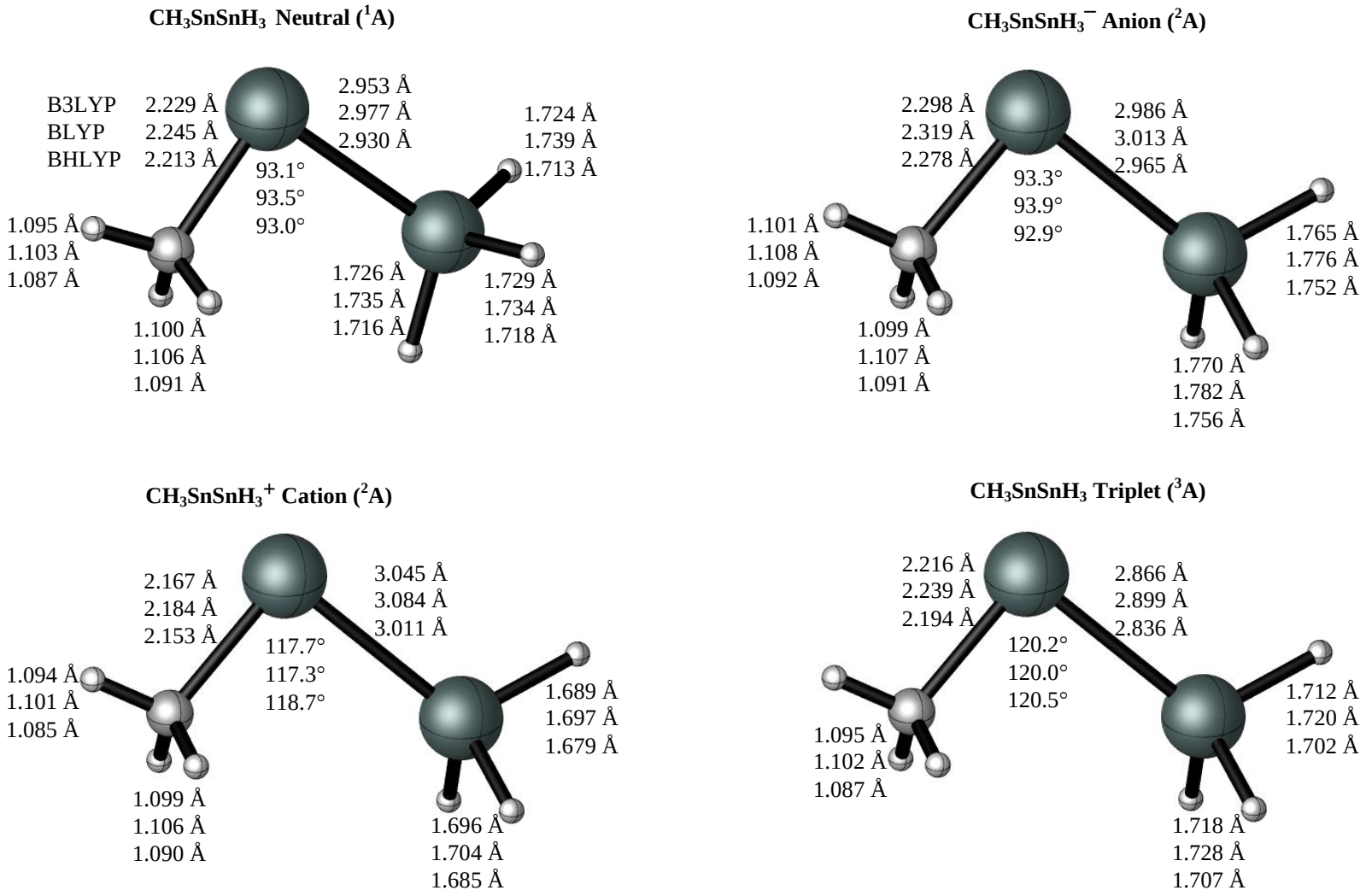

Figure S39. Equilibrium geometries for the ^{1}A ground state of CH_3SnSnH_3, ^{2}A ground state of the $CH_3SnSnH_3^-$ anion, ^{2}A ground state of the $CH_3SnSnH_3^+$ cation, and ^{3}A excited state of neutral CH_3SnSnH_3.

SiH_3SnGeH_3

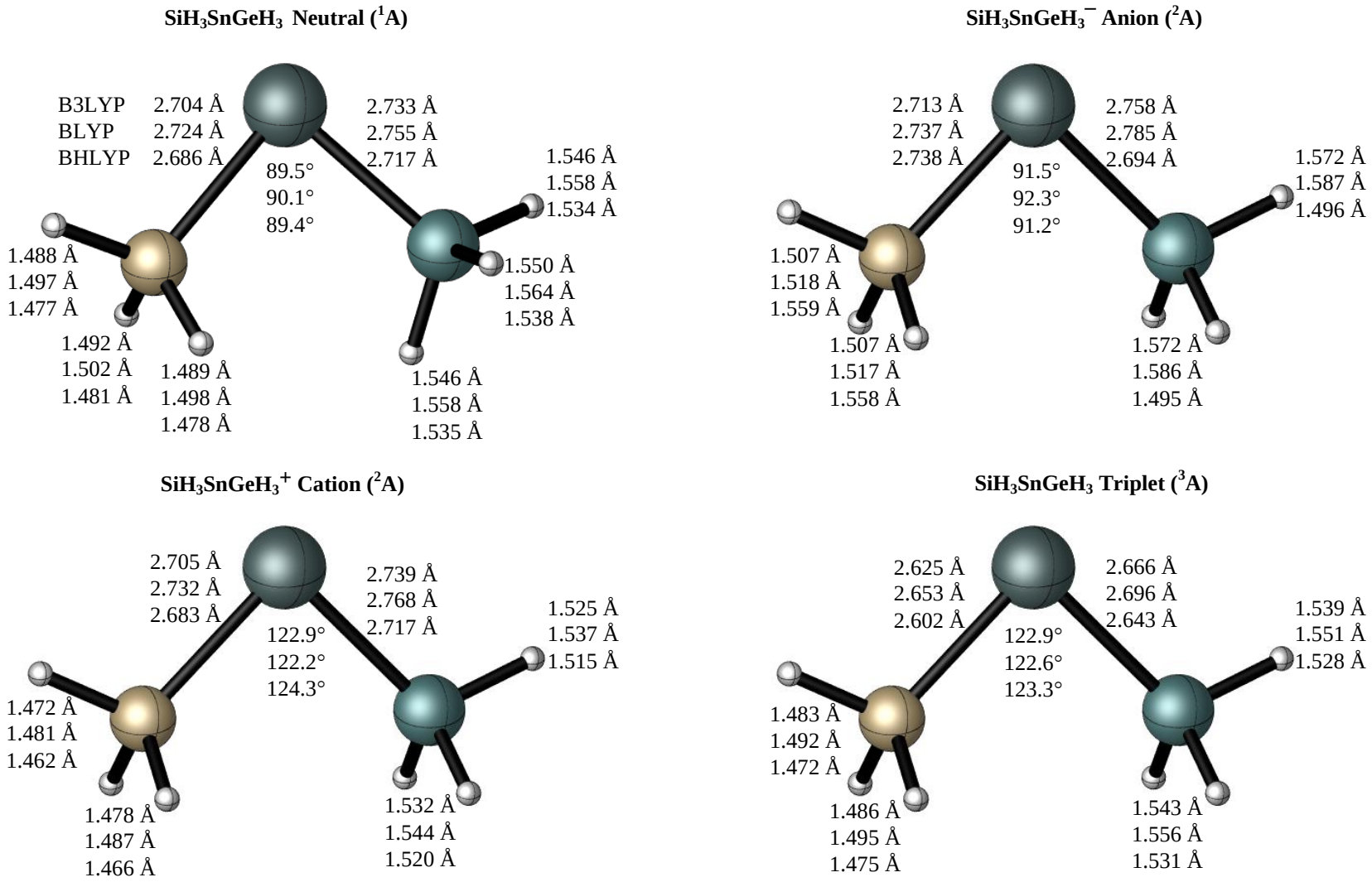

Figure S40. Equilibrium geometries for the ^{1}A ground state of SiH_3SnGeH_3, ^{2}A ground state of the $SiH_3SnGeH_3^-$ anion, ^{2}A ground state of the $SiH_3SnGeH_3^+$ cation, and ^{3}A excited state of neutral SiH_3SnGeH_3.

SiH_3SnSnH_3

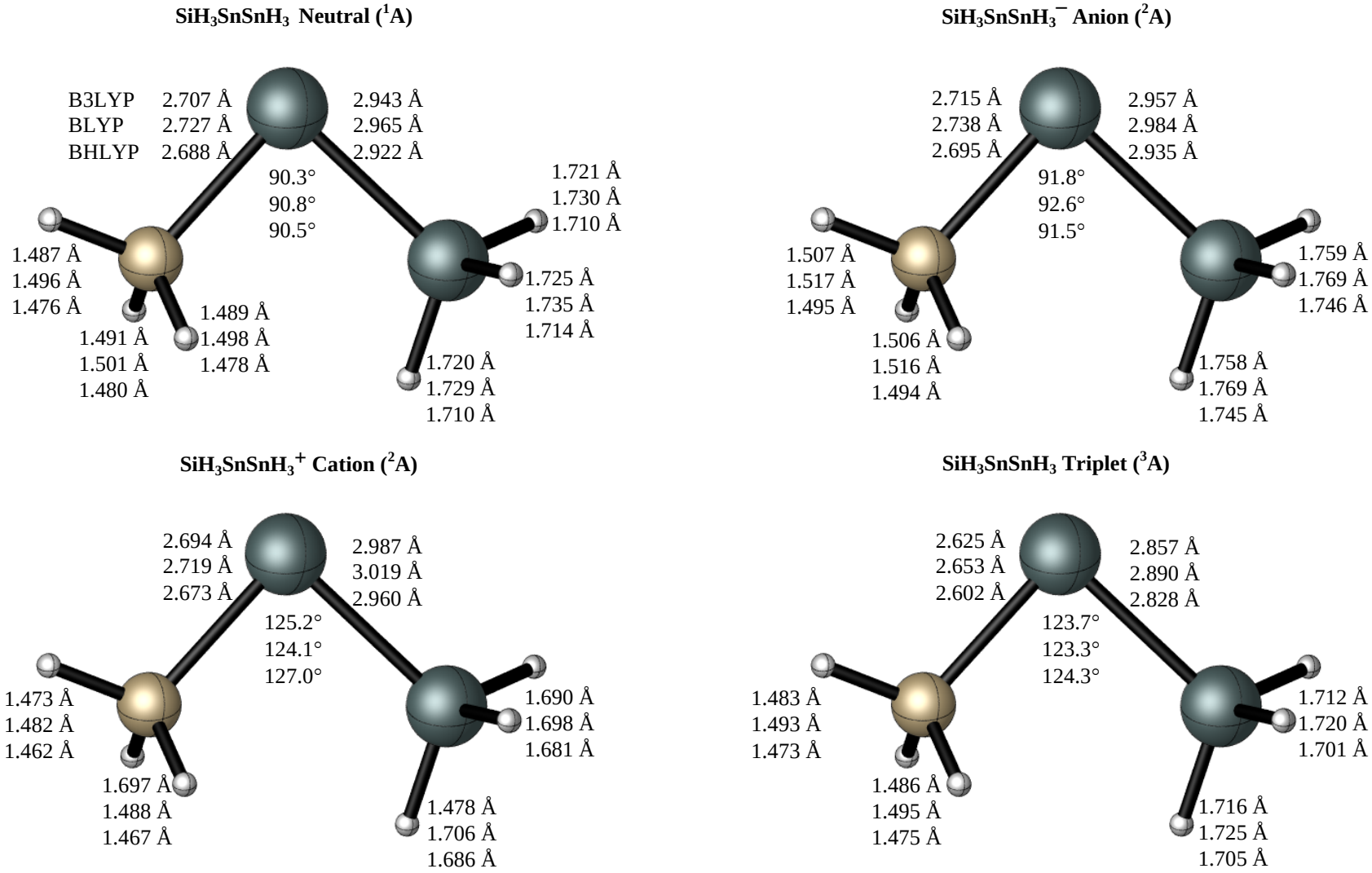

Figure S41. Equilibrium geometries for the ^{1}A ground state of SiH_3SnSnH_3, ^{2}A ground state of the $SiH_3SnSnH_3^-$ anion, ^{2}A ground state of the $SiH_3SnSnH_3^+$ cation, and ^{3}A excited state of neutral SiH_3SnSnH_3.

GeH_3SnSnH_3

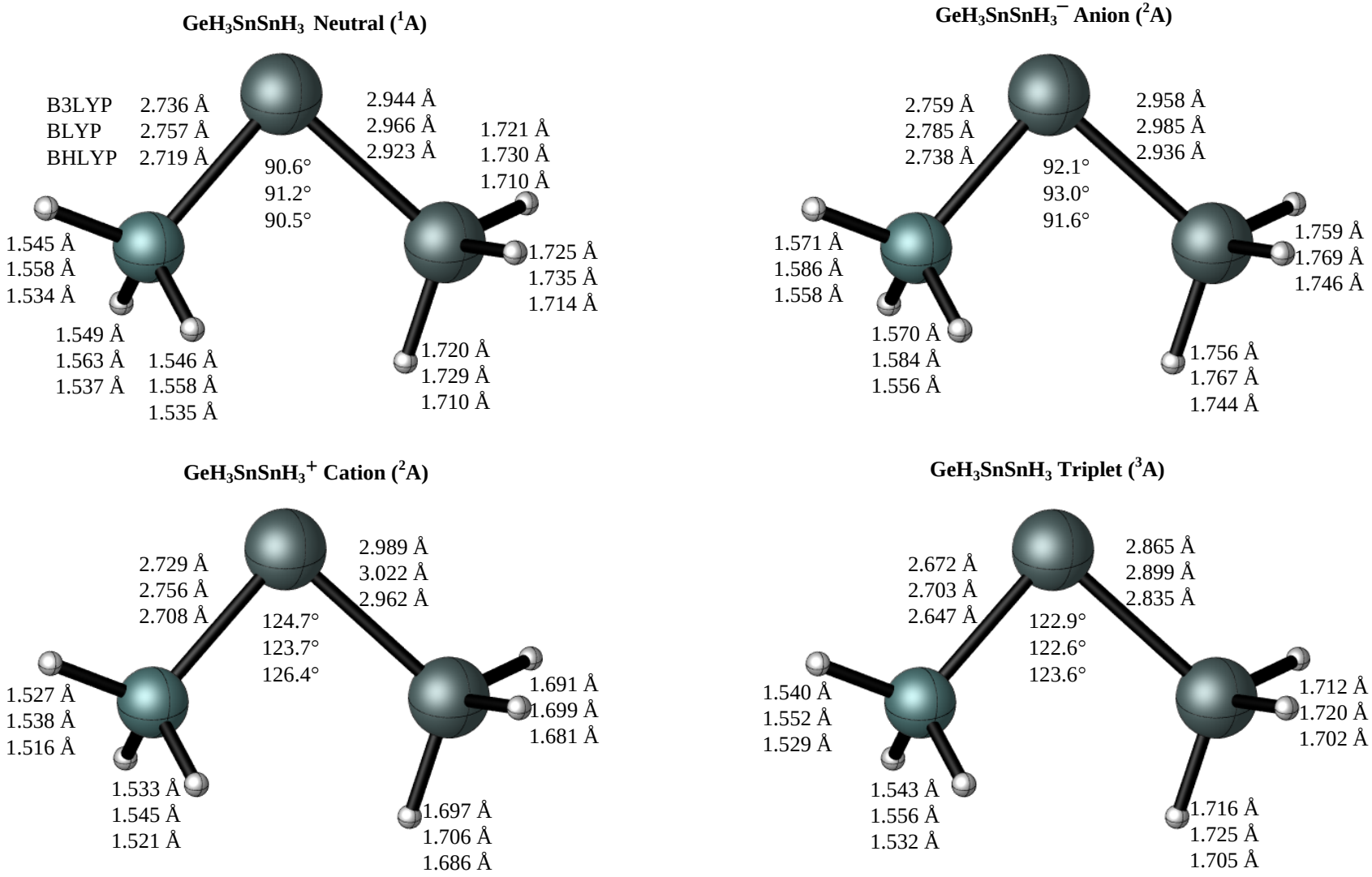

Figure S42. Equilibrium geometries for the ^{1}A ground state of GeH_3SnSnH_3, ^{2}A ground state of the $GeH_3SnSnH_3^-$ anion, ^{2}A ground state of the $GeH_3SnSnH_3^+$ cation, and ^{3}A excited state of neutral GeH_3SnSnH_3.