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Erratum: Fluxionality and low-lying transition structures of the water trimer [J. Chem. Phys. 99, 5228 (1993)]

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In this work, the basis set superposition errors (BSSE) of the various conformers of $(H_2O)_3$ were calculated using the full counterpoise (CP) procedure. Defining the three water monomers as X, Y, and Z, one has BSSE $(X-Y-Z)=E(X)_X+E(Y)_Y+E(Z)_Z-E(X)_{XYZ}-E(Y)_{XYZ}-E(Y)_{XYZ}$ where, e.g., $E(X)_X$ represents the energy of X calculated in the basis of X alone, and $E(X)_{XYZ}$ the energy of X calculated in the basis of X plus Y plus Z. The three BSSE contributions of the type $E(X)_X$ were erroneously calculated in the optimized monomer geometry, instead of the optimized geometry in the *trimer*. Hence, the different BSSE contributions and the BSSE corrected binding ener-

gies given in lines 3 to 6 of Table I are incorrect. The corrected Table I is thus presented here.

The CP corrected energies of the {uuu}, {upd}, and (ppp) structures relative to the minimum-energy {uud} structure given in Table II also change slightly. The corrected columns 7 and 8 of Table II are also presented here.

In all cases, the CP corrected and uncorrected energy values (column 7 of Table II) are now closer together, which strengthens the qualitative conclusions presented and discussed. Specifically, the $\{upd\}$ transition structure now lies energetically higher than the $\{uud\}$ structures at both the CP corrected and uncorrected levels.

TABLE I. Calculated binding energy contributions ΔE (kcal/mol) for the equilibrium structure and several transition structures of $(H_2O)_3$, optimized at the Hartree-Fock (HF) and Møller-Plesset (MP2) levels.

| Structure | { <i>u</i> 1 | ud} | C ₃ {1 | ıuu} | C _{3h} { | ppp} | {upd}* |
|--|--------------|-------|-------------------|-------|-------------------|-------|--------|
| optimization level | HF | MP2 | HF | MP2 | HF | MP2 | HF |
| $\Delta E(\mathrm{HF})$ | 13.70 | 13.09 | 13.20 | 12.52 | 13.13 | 12.96 | 13.64 |
| $\Delta E(MP2)^b$ | 3.60 | 4.69 | 3.13 | 4.46 | 2.60 | 2.93 | 3.45 |
| δ ^{CP} _{HF} δ ^{CP} _{MP2} d | -1.22 | -1.53 | -1.07 | -1.45 | -0.91 | 1.07 | -1.16 |
| δĈP d MP2 | -2.18 | 2.70 | -1.86 | -2.57 | -1.43 | -1.63 | -2.06 |
| $\delta^{CP} \doteq \delta^{CP}_{HF} + \delta^{CP}_{MP2}$ | -3.39 | -4.22 | -2.93 | -4.02 | -2.33 | -2.70 | 3.22 |
| $\Delta E(HF) + \Delta E(MP2) + \delta^{CP}$ | 13.91 | 13.56 | 13.41 | 12.96 | 13.40 | 13.19 | 13.87 |

^aHF optimized structure only.

TABLE II. Overview of $(H_2O)_3$ calculated interaction energies $\Delta E (\text{cm}^{-1})$ for the stationary and "special" points. Structures are optimized at the HF and MP2 levels, as noted.

| Structure | $\Delta E^{ m HFa}$ | ΔE^{MP2} |
|----------------|---------------------|------------------|
| "Chair" {uud} | 0 | 0 |
| "Crown" {uuu} | 171(172) | 209 |
| "Planar" {ppp} | 177(196) | 128 |
| {upd} | 11(20) | |
| Saddle point | | |
| {uup} | (140) | |
| Not stationary | | |
| { <i>upp</i> } | (126) | |
| Not stationary | | |

^aCounterpoise corrected energies, relative to {uud} structure; counterpoise uncorrected values in parentheses.

bMP2 contribution; frozen-core approximation employed.

^cCounterpoise correction at HF level.

^dCounterpoise correction at MP2 level.