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RIXS Reveals Hidden Electronic Transitions of the Aqueous OH Radical[1] L YOUNG, G DOUMY, P HO, AM MARCH, SH SOUTHWORTH, Y KUMAGAI, A AL HADDAD, M-F TU, Argonne Natl Lab, L KJELLSON, J-E RUBENSSON, Uppsala University, Z-H LOH, T DEBNATH, M BIN MOHD YUSOF, NTU, C ARNOLD, R SANTRA, CFEL/DESY, WF SCHLOTTER, S MOELLER, G COSOLOVICH, J KORALEK, M MINITTI, SLAC, M SIMON, Sorbonne, ML VIDAL, S CORIANI, DTU, K NANDA, AI KRYLOV, USC — We present RIXS spectra of the short-lived hydroxyl radical formed via proton transfer after ionization of pure liquid water [1]. Photoexcitation at the OH-resonance at 526 eV gives rise to an energy loss feature at 4 eV, corresponding to the localized A←X transition of the OH(aq) radical – which is hidden by charge transfer transitions in the direct UV absorption spectrum. Theoretical calculations predict relative intensities of localized and deloclized RIXS transitions for OH(aq) and the $\mathrm{OH}^-(aq)$ anion. Time-resolved RIXS highlights the localized transitions in the transient OH(aq) radical and may be used to track the electronic state evolution of this chemically aggressive species. [1] Z-H Loh *et al.* Science **367**, 179-182 (2020)

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