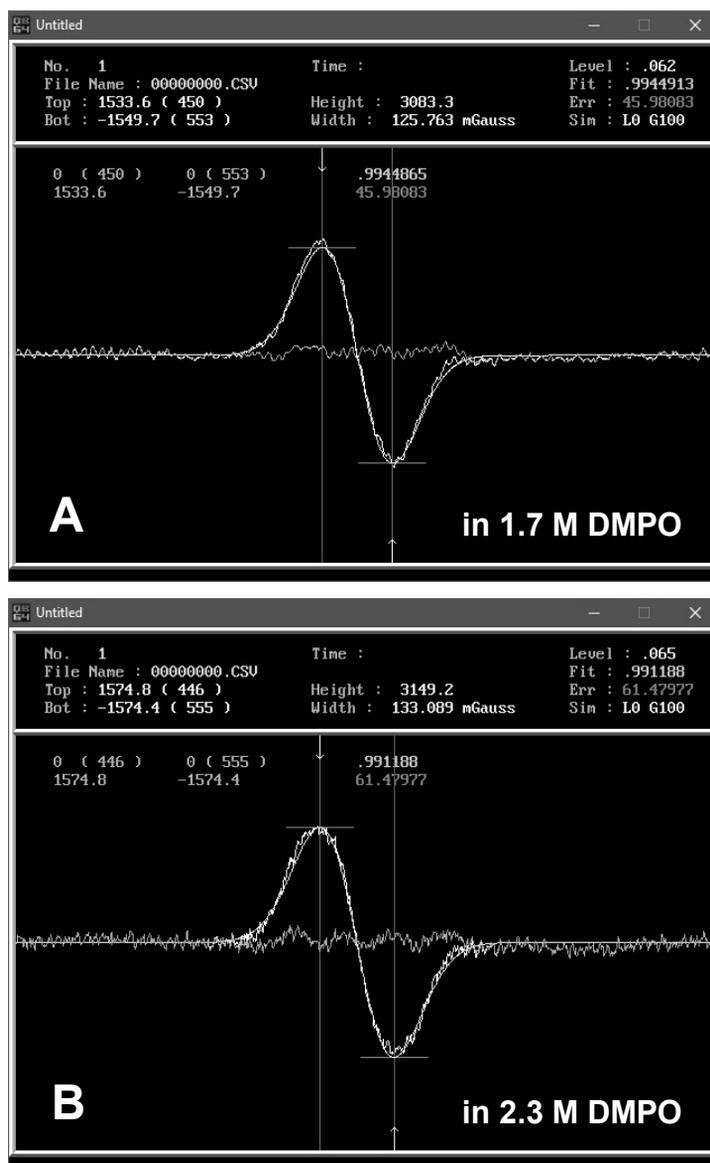


**Figure S1.** Conceptual images of uniform and localized distribution of molecules in a certain volume. (A) Twelve  $\cdot\text{OH}$  were uniformly distributed in a  $1000\text{-nm}^3$  volume. (B) Twelve  $\cdot\text{OH}$  were localized on a linear beam track. The concentration of  $\cdot\text{OH}$  in both A and B is 20 mM. The linear-density, which is defined as the number of molecules aligned on the linear unit of distance, is the reciprocal of the inter-molecular distance of the subjected molecules at a certain concentration.



**Figure S2.** Display windows of the in-house line fitting software. A calculated Gaussian line was fitted on the 2nd line from the lower field of the 4-line EPR spectrum of DMPO-OH in (A) 1661 mM and (B) 2278 mM DMPO water solution by X-ray irradiation. The white line indicates the experimental spectrum.