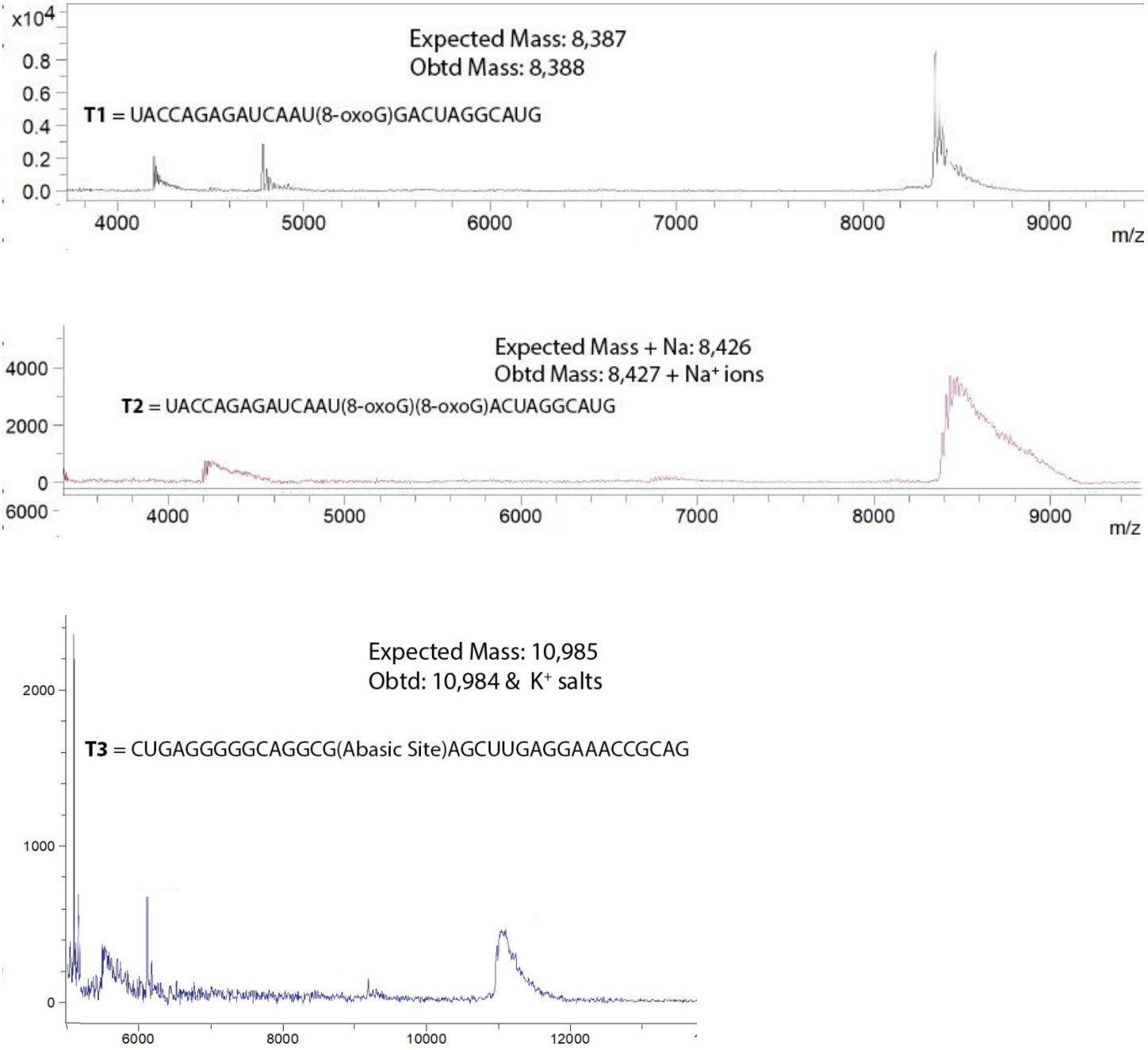


Figure S1. MALDI TOF corresponding to ONs **T1** (top), **T2** (middle), and **T3** (bottom), using HPA as matrix.

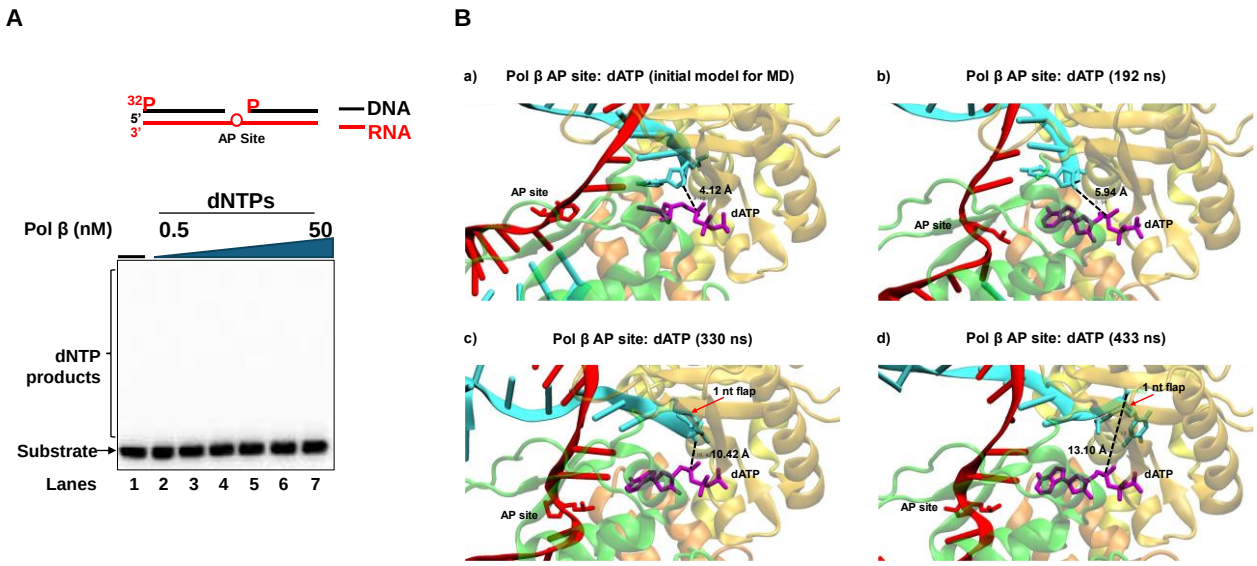


Figure S2. Pol β RNA-guided DNA synthesis on a 1 nt gap opposite an RNA AP site and the molecular dynamics simulations of the ternary complexes of pol β with a 1 nt DNA gap substrate containing an RNA AP site. Pol β RNA-guided DNA synthesis on the substrate (50 nM) containing a 1 nt gap opposite an RNA AP site was examined in the presence of 0.5-50 nM pol β, 50 μM dNTPs, and 5 mM Mg^{2+} at 37°C for 30 mins. The MD experiments for pol β -1 nt DNA gap:RNA AP-Site-incoming dATP were performed for 500 ns under the conditions described in Materials and Methods. (A) indicate pol β nucleotide incorporation opposite an AP site in the presence of all four dNTPs. For panel (A), lanes 2–7 represent pol β DNA synthesis with an RNA AP site in the presence of all four dNTPs. Lane 1 indicates substrate only. (B) indicate the MD results of the ternary complex of pol β -1 nt gap DNA:AP site-incoming dATP. (a) The ternary complex of pol β-1 nt DNA gap-RNA AP-dATP model created for conducting MD experiments. (b) indicates the simulation result of the ternary complex of pol β-1 nt DNA gap-RNA AP-dATP at the 192 ns. (c)-(d) illustrate the simulation results of the ternary complex of pol β-1 nt DNA gap-RNA AP-dATP at the 330 ns and 433 ns, respectively. All experiments were repeated at least three times.