Abstract. In this paper we study the trace spectra of polynomial bases for $\mathbb{F}_{2^n}$ over $\mathbb{F}_2$. Shparlinski showed that there exists a polynomial basis having $O(\log n)$ elements of trace one. Here we show that for every $t \leq n$, there exists a polynomial basis having $t + O(\log n)$ elements of trace one. We also study consequences of our results to the existence of irreducible polynomials of certain weights.