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**Ruberman.** *Topologically slice knots with non-trivial Alexander polynomial.*

We demonstrate a family of knots which bound topological locally flat disks in the four ball (i.e. are topologically slice) but do not bound smooth disks. Our examples are notable in that not only are their Alexander polynomials non-trivial, but they are not smoothly concordant to any knot with non-trivial Alexander polynomial. Moreover, we find that there are many such knots, in the following sense: If  $\mathcal{C}_T$  denotes the subgroup of the smooth concordance group generated by topologically slice knots, and  $\mathcal{C}_P$  denotes the subgroup of  $\mathcal{C}_T$  generated by knots with Alexander polynomial one, then we show  $\mathcal{C}_T/\mathcal{C}_P$  is infinitely generated. Our results use the Ozsváth-Szabó invariants in an essential way. (Received September 20, 2009)