Problem 3: Evaluate the Sum

Let $a \neq 1$ be a positive real number such that $a^{2020} - 5a^2 + 4 = 0$. Find the value of the sum $a^2 + a^4 + \cdots + a^{2018}$.

As always, show your work, fully explain and justify your answer. A solution mainly obtained by computers or calculators will not be accepted.