Two selfadjoint operators $T$ and $S$ on a Hilbert space such that $sp(ST)$ is not a subset of $\mathcal{R}$.

Consider

\[
S = \begin{pmatrix} 0 & 1 \\ 1 & 0 \end{pmatrix}, \quad T = \begin{pmatrix} 1 & 0 \\ 0 & -1 \end{pmatrix}
\]

belonging to $B(\mathbb{C}^2)$. Then $S$ and $T$ are Hermetian, but $sp(ST) = \{i, -i\}$ which is not a subset of $\mathcal{R}$. 