Figure 1  XRD patterns for the three types of fresh and used silver-based catalysts. (a), Ag-SiO$_2$-MgO; (b), Ag-SiO$_2$-Al$_2$O$_3$; (c), Ag-SiO$_2$-MgO-Al$_2$O$_3$. c—alpha-cristobalite, s—crystalline silver.

Figure 2  SEM morphology for the three types of fresh (upper) and used (nether) silver-based catalysts. (a), Ag-SiO$_2$-MgO; (b), Ag-SiO$_2$-Al$_2$O$_3$; (c), Ag-SiO$_2$-MgO-Al$_2$O$_3$.

Figure 3  SEM morphology of regeneration process for the used Ag-SiO$_2$-MgO-Al$_2$O$_3$ catalyst by calcination in air for different times at 973K.
Figure 4 NH$_3$-TPD and CO$_2$-TPD profiles of three Ag-based catalysts. a: Ag-SiO$_2$-MgO; b: Ag-SiO$_2$-Al$_2$O$_3$; c: Ag-SiO$_2$-MgO-Al$_2$O$_3$