[0013] U.S. Patent No. 5,043,519 ('519) discloses a process for the production of tertiary olefins by decomposing alkyl tertiary-alkyl ethers in the presence of a catalyst containing 0.1 to 1.5 weight percent alumina on silica. As disclosed, at least 0.5 weight percent alumina is required for slower catalyst deactivation, and addition of small quantities of water into the feed stream may suppress DME formation. Nevertheless, the experimental results presented in Table 2 of the '519 patent shows more than about 1800 ppm DME by weight in the product stream at about 75% MTBE conversion, and more than 4500 ppm DME at a slightly higher conversion of 76.8%.

[0014] U.S. Patent Nos. 4,880,787, 4,871,446, 4,888,103, and 4,324,698 each mention that amorphous silica-alumina catalysts are useful as cracking catalysts. However, as noted in U.S. Patent No. 4,880,787, the major conventional cracking catalysts in use at that time (late 1980's, early 1990's), the same time period as the aforementioned U.S. Patent No. 4,691,073, generally incorporated a large pore crystalline aluminosilicate. To the present inventor's knowledge, commercial synthetic silica-alumina catalysts for cracking remain to this day to be of a crystalline nature.

[0015] Accordingly, there exists a need for improved catalysts for the production of tertiary olefins. Such improved catalysts are desired to have one or more of an increased cycle length, good physical integrity, a low attrition rate, a high crushing strength, decreased production costs, and decreased disposal costs.

SUMMARY OF THE DISCLOSURE

[0016] ~~In one aspect, e~~Embodiments disclosed herein relate to a process for the production of olefins from at least one of an alcohol and an ether, the process including: contacting at least one of an alcohol and an ether with a hydrofluoric acid-treated amorphous synthetic alumina-silica catalyst under decomposition conditions to produce an olefin.

[0017] ~~In another aspect, e~~Embodiments disclosed herein further relate to a process for the production of isobutylene from methyl tertiary butyl ether, the process including: feeding methyl tertiary butyl ether (MTBE) to a reactor having at least one reaction zone containing a hydrofluoric acid-treated amorphous synthetic alumina-silica catalyst; contacting the MTBE with the hydrofluoric acid-treated synthetic alumina-silica catalyst under decomposition conditions to produce a reactor effluent comprising isobutylene,

unreacted MTBE, heavies, and methanol; feeding the reactor effluent to a first distillation column; separating the isobutylene from the unreacted MTBE, heavies, and the methanol in the first distillation column to recover a first bottoms fraction comprising heavies, unreacted MTBE, and methanol and an isobutylene-rich overheads fraction.

[0018] In oneanother aspect, there is providedembodiments disclosed herein relate to a catalyst useful for the decomposition of ethers and alcohols to form olefins, the catalyst comprising a hydrofluoric acid-treated amorphous synthetic alumina-silica catalyst.

[0018a] In another aspect, there is provided a catalyst useful for the decomposition of ethers and alcohols to form olefins, the catalyst comprising a selectively poisoned amorphous synthetic alumina-silica catalyst.

[0019] OtherIn another aspect, embodiments disclosed herein relate to a process for the production of olefins from at least one of an alcohol and an ether, the process comprising: contacting at least one of an alcohol and an ether with a selectively poisoned amorphous synthetic alumina-silica catalyst under decomposition conditions to produce an olefin.

[0020] Other aspects and advantages will be apparent from the following description and the appended claims.

BRIEF DESCRIPTION OF DRAWINGS

[0021] Figure 1 is a simplified process flow diagram for producing tertiary olefins according to embodiments disclosed herein.

[0022] Figure 2 is a graphical comparison of the catalyst activity, as measured by MTBE conversion, of catalysts according to embodiments disclosed herein as compared to prior art catalysts.

[0023] Figure 3 is a graphical comparison of the catalyst activity, as measured by MTBE conversion, of catalysts according to embodiments disclosed herein as compared to prior art catalysts.

[0024] Figure 4 is a simplified process flow diagram for producing tertiary olefins according to embodiments disclosed herein.

DETAILED DESCRIPTION

[0025] In one aspect, embodiments disclosed herein relate to a process for the production of olefins from ethers and alcohols, and catalysts therefore. In another aspect, embodiments disclosed herein relate to a process for the production of catalysts useful for the cracking of ethers and alcohols to form olefins.