CLAIMS

1. An alkylation process, comprising: separating and recycling a hydrogen gas and a hydrogen chloride from an offgas (50) of a hydrogenation reactor (100) used to regenerate a used alkylation catalyst; wherein the hydrogen gas is recycled to the hydrogenation reactor (100); and wherein the hydrogen chloride is recycled to an alkylation reactor (300), wherein the hydrogen chloride is extracted from the offgas (50) of the hydrogenation reactor (100) using a hydrocarbon extraction solvent (25).

2. The alkylation process of claim 1, wherein the hydrocarbon extraction solvent (25) comprises an isomerized olefin.

3. The alkylation process of claim 1, wherein the alkylation reactor (300) uses an alkylation catalyst comprising a chloride.

4. The alkylation process of claim 3, wherein the alkylation catalyst is an ionic liquid catalyst.

5. The alkylation process of claim 4, wherein ~~a~~the hydrocarbon extraction solvent (25) is fed into a stream selected from the group consisting of a hydrogenated effluent (10), the offgas (50) of the hydrogenation reactor (100) that was separated in a separator (400), and a combination thereof.

6. The alkylation process of claim 5, wherein the hydrocarbon extraction solvent (25) is fed at a vol/vol ratio of the hydrocarbon extraction solvent (25) to the ionic liquid catalyst from 1.0 to 100.

7. The alkylation process of claim 5, wherein a vol/vol ratio of the hydrocarbon extraction solvent (25) to the ionic liquid catalyst is selected to provide a level of hydrogen chloride less than 600 wppm in a gas fraction comprising a hydrogen (20).