CLAIMS

1. A process for scrubbing an off-gas stream comprising carbon monoxide and methyl iodide in an absorption column of an acetic acid production unit, the absorption column comprising

a bottom section comprising a feed inlet and one or more liquid outlets; and

above the bottom section, a top section comprising one or more liquid inlets and a vapour outlet;

the process comprising

through the feed inlet, introducing the off-gas stream to the absorption column;

through a liquid inlet of the one or more liquid inlets, introducing a methanol stream at a first flow rate, the methanol stream having a first temperature at the liquid inlet, the first temperature being at least 18 °C (e.g., at least 20 °C, or at least 22 °C, orat least 24 °C);

in the absorption column, contacting the off-gas stream with the methanol stream;

through a liquid outlet of the one or more liquid outlets, withdrawing a first liquid effluent from the absorption column, the first liquid effluent comprising methanol and methyl iodide; and

through the vapour outlet, withdrawing a vapour effluent from the absorption column,

the process further comprising separating the withdrawn vapour effluent in a heat exchanger to provide a vapour fraction and a liquid fraction comprising methanol, where

- the vapour fraction comprises at most 2.5 wt.% methanol, and
- the methanol stream includes at least a portion of the liquid fraction comprising methanol;

the process further comprising, after introducing the methanol stream to the absorption column,

decreasing the flow rate of methanol transferred to the absorption column;

through a liquid inlet of the one or more liquid inlets, transferring an acetic acid stream to the top section of the column at a third flow rate, the acetic acid stream having a third temperature at the inlet; and

in the absorption column, contacting the off-gas stream with the acetic acid stream;

wherein the third temperature is in the range 18 °C to 40 °C,

and wherein the third temperature differs from the first temperature by at most 5 °C.

2. The process of claim 1, wherein the vapour effluent withdrawn while introducing the methanol stream to the absorption column comprises at most 500 ppmv (e.g., at most 350 ppmv, at most 200 ppmv, or at most 100 ppmv) methyl iodide.

3. The process according to claim 1 or claim 2, further comprising transferring the first liquid effluent to a reaction zone of the acetic acid production unit.

4. The process according to claim 3, wherein liquid effluent transferred to the reaction zone of the acetic acid production unit comprises at most 250 ppmv (e.g., at most 200 ppmv, or at most 100 ppmv, or at most 50 ppmv) acetic acid.

5. The process according to any of claims 1–4, further comprising, before introducing the methanol stream to the absorption column,

through the feed inlet, transferring the off-gas stream to the bottom section of the absorption column;

through a liquid inlet of the one or more liquid inlets, introducing an acetic acid stream to the top section of the absorption column at a second flow rate, the acetic acid stream having a second temperature at the liquid inlet; and

in the absorption column, contacting the off-gas stream with the acetic acid stream;

the method further comprising, after a first time period of contacting the off-gas stream withthe acetic acid stream,

decreasing the flow rate of the acetic acid stream (e.g., to about zero) and introducing the methanol stream to the absorption column, to transition from acetic acid to methanol;

and wherein the second temperature is at least 18 °C, and

wherein the second temperature differs from the first temperature by at most 5 °C.

6. The process of claim 5, wherein the second temperature differs from the first temperature by at most 3.5 °C, or at most 2 °C.

7. The process of claim 5 or claim 6, further comprising, while introducing the

acetic acid stream to the absorption column, withdrawing a second liquid effluent from the absorption column through a liquid outlet of the one or more liquid outlets, the second liquid effluent comprising acetic acid and methyl iodide.

8. The process of claim 7, wherein the second liquid effluent is transferred to a light-ends recovery zone of the acetic acid production unit.

9. The process of claim 8, wherein the second liquid effluent transferred to the light-ends recovery zone of the acetic acid production unit comprises at least 25 ppmv (e.g., at least 100 ppmv, or at least 250 ppmv) acetic acid.

10. The process of any of claims 5–9, further comprising, while introducing the acetic acid stream to the absorption column, withdrawing a vapour effluent from the absorption column through the vapour outlet, wherein the vapour effluent withdrawn while introducing the acetic acid stream to the absorption column comprises at most 500 ppmv (e.g., at most 350 ppmv, or at most 200 ppmv, or at most 100 ppmv) methyl iodide.

11. The process of any of claims 5–10, wherein the acetic acid stream includes at least a portion of an overhead stream of a heavy ends column of the acetic acid production unit.

12. The process of any of claims 5 to 11 wherein, after the transition, the weight ratio of methanol to acetic acid in the absorption column is at least 500:1 while contacting the off-gas stream with the methanol stream.

13. The process of any of claims 5–12, wherein the second temperature is in the range of 18–30 °C.

14. The process of any of claims 1–13, wherein the first temperature is in the range of 18–30 °C.

15. The process of any of claims 1-14 wherein the first temperature is in the range 20 °C to 35 °C.

16. The process of any of claims 1-15 wherein the third temperature is in the range 20 °C to 40 °C.

17. The process of any of claims 1–16, wherein the off-gas stream includes at least a portion of one or more of a vapour-phase effluent of a separation zone, a light-ends recovery zone of the acetic acid production unit, and a reaction zone of the acetic acid production unit.

18. The process of claim 1, wherein the vapour fraction comprises at most 2.0 wt.%, or at most 1.5 wt.% methanol.

19. The process of claim 1, further comprising transferring the vapour fraction to a combustion system and burning the fraction in the combustion system.

20. The process of claim 1 wherein the flow rate of methanol transferred to the absorption column is decreased to about zero.

21. The process of any one of claims 1-20, wherein the third temperature differs from the first temperature by at most 3.5 °C, or at most 2 °C.