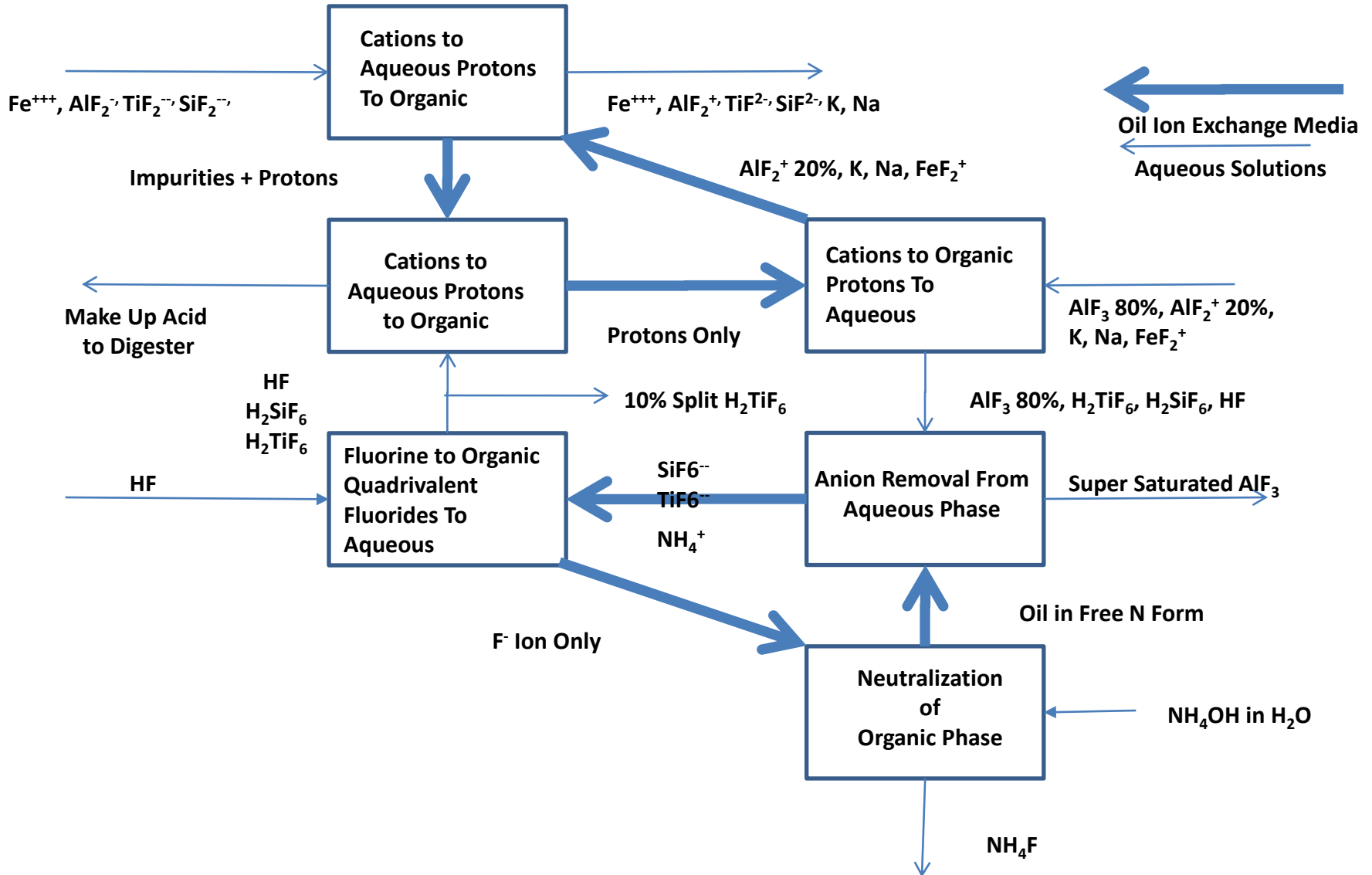


# **Oil Based Ionic Separation of Dissolved Components of a Silicate System in Mixed Fluoroacids**

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McCullough Innovations and Consulting**

# Oil Based Ionic Separation of Dissolved Components of a Silicate System in Mixed Fluoroacids

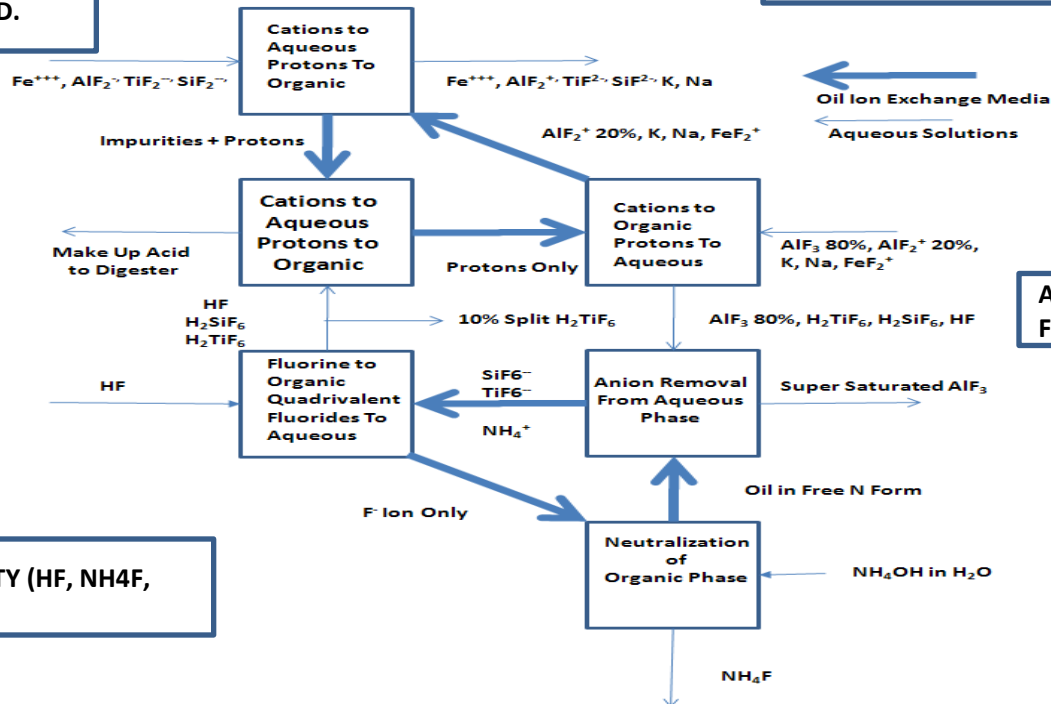


# Additional Regions of the Process Flow Diagrams Not Shown

- ALL OXIDES CONVERTED TO FLUORIDES
- FLUORIDES SEPARATED BY ION EXCHANGE, DECANTING AND VOLATIZATION
- CONTINUOUS FLOW PROCESSES USED EXCEPT FOR FIRST (INPUT) AND LAST (PRODUCT OUTPUT) STEPS
- SEPARATED FLUORIDES CONVERTED BACK TO OXIDES
- CALCIUM, MAGNESIUM AND SILICON OXIDES CAN BE USED TO SEQUESTER CO2

INPUT IS FLY ASH DISSOLVED IN HYDROFLUORIC ACID EXCEPTING CALCIUM AND MAGNESIUM FLUORIDES WHICH ARE DECANTED AND PROCESSED SEPARATELY WITH SULFURIC ACID.

SILICON, IRON AND TITANIUM FLUORIDES CONVERTED TO OXIDES TO BE SOLD ON THE COMMODITY MARKETS



REAGENT REGENERATING FACILITY (HF,  $NH_4F$ ,  $NH_4HF$ ,  $NH_3$ ,  $H_2SO_4$ )

$AlF_3$  CONVERTED TO ALUMINA FOR ALUMINUM INDUSTRY

# RELATIONSHIPS BETWEEN COAL FIRED ELECTRICITY GENERATION, FLY ASH CONVERSION AND CO<sub>2</sub> SEQUESTRATION

