Pearl River, New York April 8, 2022

ADVANCE IN PLASTICS CHEMICAL RECYCLING TO MEET A GROWING NEED

Brand owners all have recycled content goals for 2025 to 2030. If you add up all the commitments, it's a fairly huge supply of recycled polymers that is needed. The market needs a recycling process that can be scaled up to chemical industry volumes, is flexible enough to use most plastic wastes as feedstocks, has an attractive LCA, can economically enable the purchase of waste plastic feedstock, and is simple and cost effective.

Anellotech is developing an advanced chemical recycling technology (Plas-TCat™) that aims to meet these key criteria, providing extraordinary process yields of valuable hydrocarbons (especially light olefins and BTX aromatics) used today to make a wide range of plastics.

LARGE SCALE DIRECT CONVERSION OF PLASTIC WASTE IN A SINGLE REACTOR SYSTEM

Anellotech's Plas-TCat Process, effectively converts the carbon and hydrogen in most plastics via thermal catalytic reaction in a single reactor directly into the same basic chemicals (benzene, toluene and xylene (BTX) and olefins) that are used today to make virgin plastics. The valuable olefins and BTX products are created without the need to send pyrolysis-derived oils for additional deconstruction in steam cracker furnaces where further yield losses occur. It is anticipated that the Plas-TCat process will have significantly higher yields of olefins (<C5 olefins) and BTX over today's conventional pyrolysis plastic recycling technologies (which would be coupled with secondary processing in an ethylene pyrolysis furnace). While the preferred feedstocks for Plas-TCat are polyolefins, the process can also profitably process nylon, PET, polystyrene and other plastics that are widely used today.

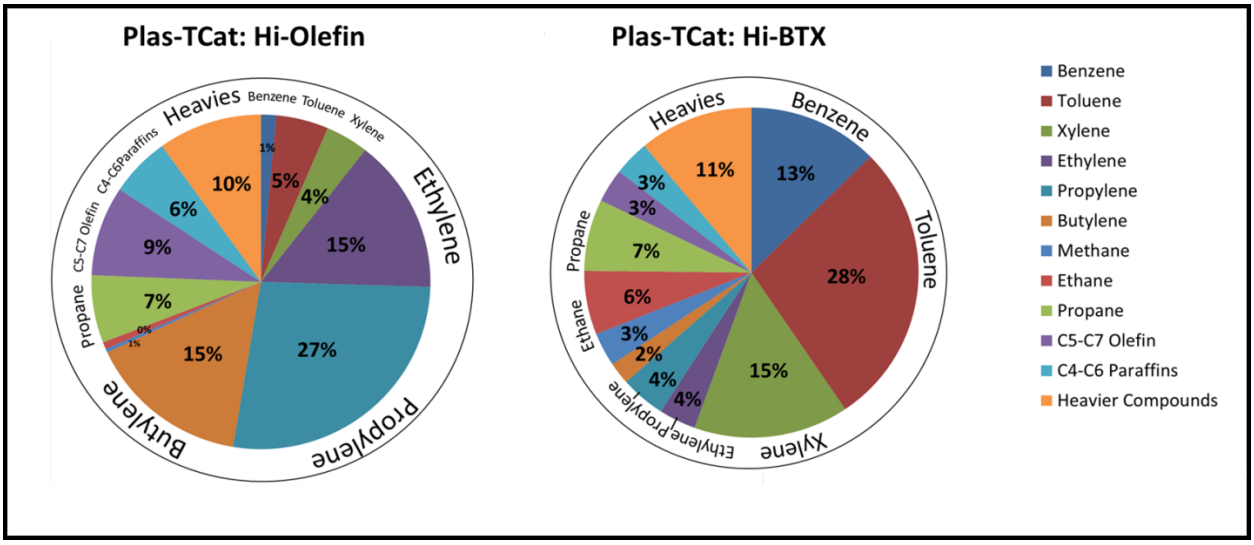
Our large scale TCat8 test unit located outside of Houston, Texas, (shown below) will demonstrate and provide scale-up bases for commercial design in Anellotech's ongoing plastics conversion development program.

TCat8 Pilot Plant

SIX REASONS THAT PLAS-TCAT IS A GAME CHANGER

1. Plas-TCat process is a **new, direct route to olefins and aromatics** from low value plastic waste feedstock
2. Competitive economics **(double digit IRR%)** using market price feedstock; no tipping fees or product price premiums.
3. Makes **valuable products from range of feedstocks** at attractive yields
    - Can feed all major plastics due to proprietary catalyst and fluid bed reactor-regenerator system design.
    - Product slate can be controlled to maximize aromatics (BTX) **or** olefins (ethylene, propylene)
    - Composites, mixed plastics can be used with minimal presorting of feedstocks (other than PVC reduction)
    - Yields can be predicted based on plastic's chemical composition
4. **No major chemical upgrading** of Plas-TCat products is required
    - Aromatics, C2-C4 olefins and paraffins ready for purification and sale or direct feeding into the downstream steam crackers purification trains.
    - No upgrading is required in ethylene furnaces -- as for thermal pyrolysis output.
5. **LCA assessment** (preliminary): potential to reduce CO2 emissions up to 50% vs. monomers from steam crackers.
6. **Scalable**. Anticipated commercial plants should exceed 200,000 metric tons/year of olefins and/or BTX production from a single reactor system processing majority polyolefin plastic waste.
    - Reactor scaling is not limited by heat transfer (multiple reactors, in parallel, are not required to scale as in liquid thermal pyrolysis). Hot, regenerated Plas-TCat catalyst serves as a carrier to provide the heat to the reactor.

Plas-TCat main products include aromatics (benzene, toluene, xylenes), olefins (ethylene, propylene) and low molecular weight paraffins (ethane, propane). Below is a chart showing yields when feeding pure polyethylene into the Plas-TCat laboratory reactors when used to maximize BTX (left chart) or olefins (right chart).



These results are exciting because the ultimate vision for high yield conversion of plastic wastes to basic polymer building blocks is on the verge of becoming reality via Anellotech's Plas-TCat.

SOLVING THE MIXED PLASTICS CONUNDRUM

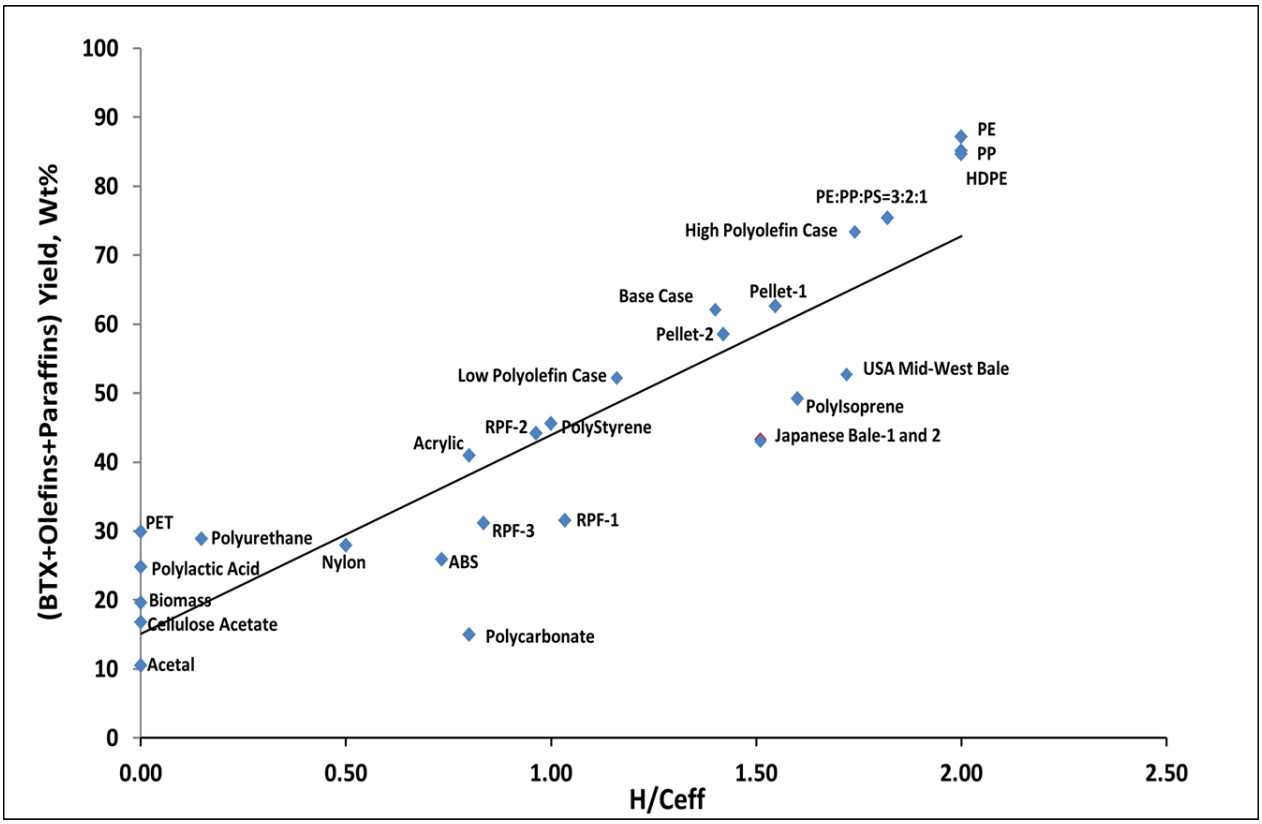
Exhibiting exciting processing flexibilities, Plas-TCat can also be used to recycle other plastic wastes. To understand how specific plastics with unique chemical compositions can be assessed for Plas-TCat yield, a ratio for Hydrogen to Effective Carbon ("H/C_{eff}") ratio was calculated for each:

$$H/C_{eff} = \frac{(H - X * O - Y * N - Z * Cl)}{(C)}$$

In general, the higher the H/C_{eff} ratio, the higher the product yield. Poly-olefins such as polyethylene and polypropylene contain only H and C and their H/C_{eff} ratio is 2. Alternatively, some plastics like nylon and PET contain heteroatoms such as nitrogen, oxygen and other elements. So these plastics' H/C_{eff} ratio is less than 2. Product yield from polyolefins is higher than from plastics that contain heteroatoms such as oxygen (like PET and polycarbonate) and nitrogen (as in nylon). Why is that? Because as shown in the above formula, the process uses some of the hydrogen to eliminate heteroatoms. For example, hydrogen reacts with oxygen to make water, hydrogen combines with nitrogen to make nitriles and ammonia and hydrogen reacts with chlorine to make hydrochloric acid. Despite lower product yields these plastics contribute to the overall yield of valuable olefins and aromatics. They do not need to be removed (and sent to landfill or incinerators) before feeding into the Plas-TCat reactor feedstock.

Mixtures of plastics can be fed into Plas-TCat, and the yields can be predicted using the following figure which indicates Plas-TCat laboratory studies for yields for various plastics. This data can

be used calculate yields for other plastics as well as plastic mixtures. Real-world plastic mixtures are also shown, including USA and Japanese bales, as well as refuse derived fuel (RDF) pellets.



OPPORTUNITIES TO COLLABORATE

Anellotech is currently seeking forward looking companies to join them in accelerating the development and the commercial implementation of the Plas-TCat technology across a broad spectrum of feedstocks and product slates. For more information, please contact:

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