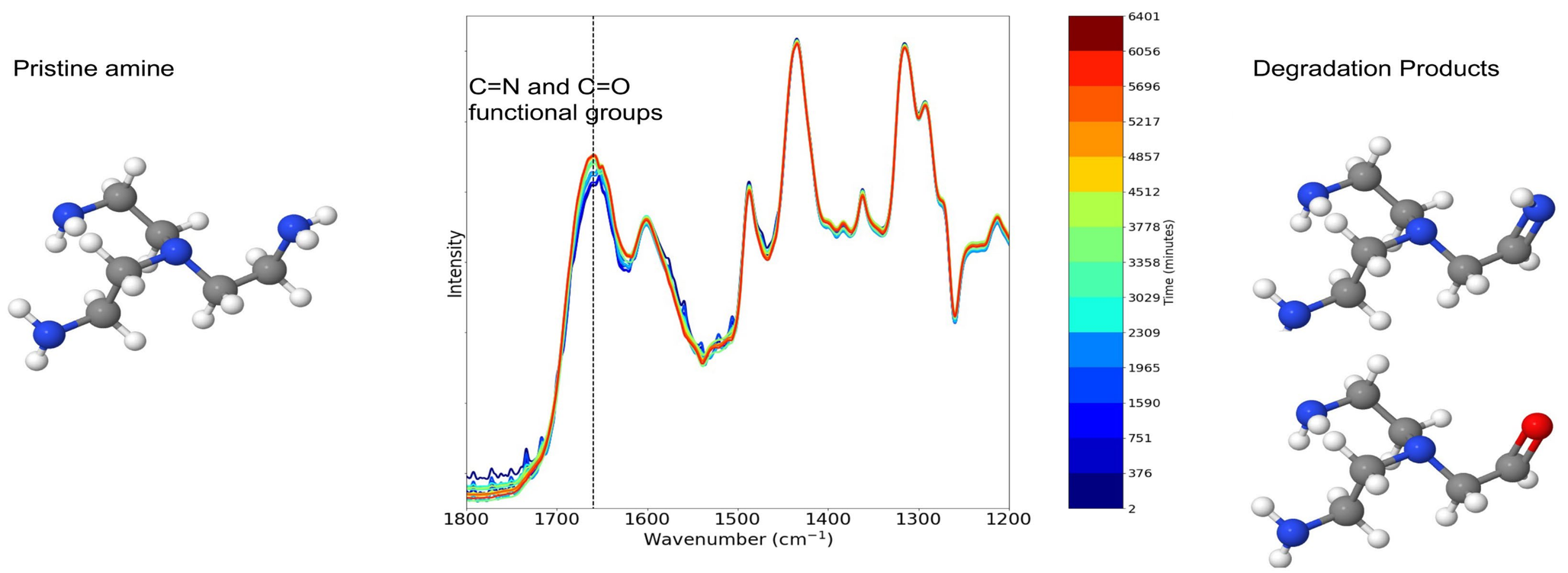
Accelerating DAC Technologies Toward Commercialization Through Degradation Studies

Understanding and mitigating direct air capture (DAC) sorbent degradation can extend sorbent lifetime, reduce cost, and accelerate technologies to market.



NETL DAC sorbent exposed to dry air at 70°C for 8 days shows evidence of degradation. Fourier-transform infrared spectroscopy shows an increase in peaks near 1660 cm^{-1} that are indicative of C=N and C=O functional groups.

NETL researchers are studying how sorbents used in DAC technologies degrade, working on ways to accurately predict sorbent lifetime, and creating strategies to limit degradation.

- Sorbent degradation is poorly understood and will have a profound impact on both the cost and potential environmental impact of DAC implementation.
- The effort leverages a unique suite of facilities and competencies including the NETL DAC Center, computational and analytical chemistry expertise, and a deep understanding of separation processes.
- Researchers will first understand degradation mechanisms, then propose accelerated aging protocols to determine how those mechanisms will impact new sorbent materials, and finally validate those protocols through extended (1000+ cycle) performance testing.

DOE PROGRAM

Carbon Dioxide Removal

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