

# ROCO

## NEWSLETTER



Winter 2022

### TEAM NEWS

#### New Hires

We are so excited announce several full-time Team Members!

Abigail Cohen-Chemist

Emily Northrop-Business Development

Sizhe Xu-Chemical Engineer Intern

To get to know our entire team, please visit our website.

[RoCo – Team](#)

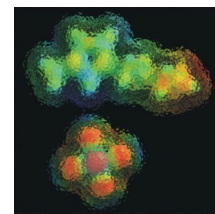
#### Polymer Recycling

We are currently working on developing an ionic compatibilizer to aid in plastics recycling. The recycling rate of plastics is extremely low, and RoCo is committed to finding a solution. For more details, please see page 2.



### SPOTLIGHT ON IONIC LIQUIDS

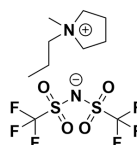
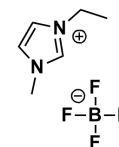
We understand the trends in properties of ionic liquids and how the properties change depending on the side-group, cation, anion, and symmetry of the ionic liquid, and can help you with choosing one to fit your needs.



#### Focus on Top-Selling IL's

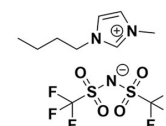
These ILs are used in electronics applications, such as lithium/sodium ion batteries, and dye synthesized solar cells.

[1-Ethyl-3-methylimidazolium tetrafluoroborate](#) (IL-0006-HP)



[1-Methyl-1-propylpyrrolidinium bis\(trifluoromethylsulfonyl\)imide-UP](#) (IL-0044-UP)

[1-Butyl-3-methylimidazolium bis\(trifluoromethylsulfonyl\)imide HP](#) (IL-0029-HP)





## Polypropylene Recycling Project

For decades, we have been hearing about recycling, especially plastics. Education on recycling for most of us in our 40s started in elementary school, with programs, ads, etc., promoting its benefits and how you can help mitigate the effects of climate change. Unfortunately, we are now learning that most plastics are not recycled. We now know that [media and corporations lied](#) to us about the recycling programs they created, doping us into using more plastics than needed.

Polyethylene (PE) and polypropylene (PP) are the most used polymers. Over 80 million metric tons of PP were made in 2021, and less than 2% was recycled. [A study published by Greenpeace](#) found that no plastics, including soda bottles which are the most common items, meet the requirements to be called “recyclable.” Over 827,000 tons are collected annually from American households, and almost all of it is sent to landfills.

Recycling done properly reduces carbon dioxide and other greenhouse gas emissions that lead to climate change. Increasing the PP recycling rate to 50% would mean taking 7.5 million cars off U.S. highways, avoiding 34,607,544 tons of CO<sub>2</sub> emitted annually. That said, PP is a difficult polymer to recycle.

RoCo is committed to finding a solution by developing innovative technologies that will aid in the upcycling of PP. We are currently working on an ionic compatibilizer that is halide free, non-toxic, and miscible with polyolefins. Our initial work is promising and has already demonstrated that a small amount of ionic compatibilizer ~0.5 wt.% significantly improves mechanical and impact properties and overcomes the stiffness-impact trade-off. The ionic nature of the compatibilizer provides an interface to form highly miscible domains. We have also observed a 30% improvement in mechanical properties in glass-fibered filled PP. If we are successful in the commercialization of this technology, it will improve recycling rates. Based on our initial estimates, the ionic compatibilizer cost will be much lower per Kg of polymer, providing a cost-effective methodology compared to the current block copolymer approach. We also estimate that it would increase the polypropylene recycling rates, resulting in a new market opportunity.

We are working on this goal to develop ionic compatibilizers which make PP resilient to contaminants. This results in upcycling of PP upon recycling. This would allow us to engage with industry leaders and fast-track the commercialization of this technology.

**Happy Holidays and Happy  
New Year from all of us at  
RoCo!**

For More Information

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