## Category

Synthesis of
Materials and
Unnatural Products

## Key words

## polyacetylene

conducting polymers

## ROMP

polymerization
retrocyclization

Synfact


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Significance: Polyacetylene (6) is the simplest organic conducting polymer and was pivotal to the development of the field organic electronics, an impact that was recognized with a Nobel prize in 2000. Sensitivity to atmospheric conditions stymied early efforts towards the investigation and application of this material. Edwards and Feast provided a method for the casting and controlled formation of trans-polyacetylene using a creative ROMP and thermal cycloreversion of polymer 5.

Comment: Monomer 4 was prepared by the cycloisomerization of cyclooctatetraene (1) and subsequent Diels-Alder reaction with perfluorobutyne (3). Ring-opening metathesis of 4 with a titanium tetrachloride/trimethylaluminum catalyst, stereoselectively provides polymer 5. At room temperature, this polymer decomposed to provide trans-polyacetylene (6) and 1,2-bistrifluoromethyl benzene (7) over several days. Heating under vacuum accelerates this process, providing 6 in three hours.

