



Synthesis and Magnetic Properties of New Chromium(III)-Acetylide-TTF Type Complexes

Junichi Nishijo¹, Yoshitaka. Shima¹ and Masaya Enomoto²
 (¹Meisei University, ²Tokyo University of Science)

1. Introduction

Previously, we reported a promising magnetic properties of [CrCyclam(C≡C-MeEDT-TTF)₂]ⁿ⁺ (Fig. 1). In the oxidation state of the complex, the magnetic moment of Cr³⁺ (*S* = 3/2) strongly interacts with those of the TTF ligands (*S* = 1/2), while the latter can bring the strong inter-molecular exchange interaction through π -stackings.

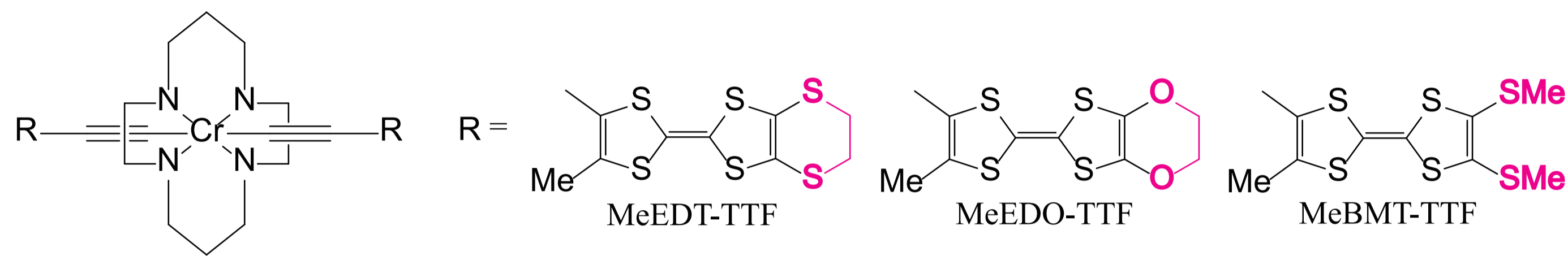
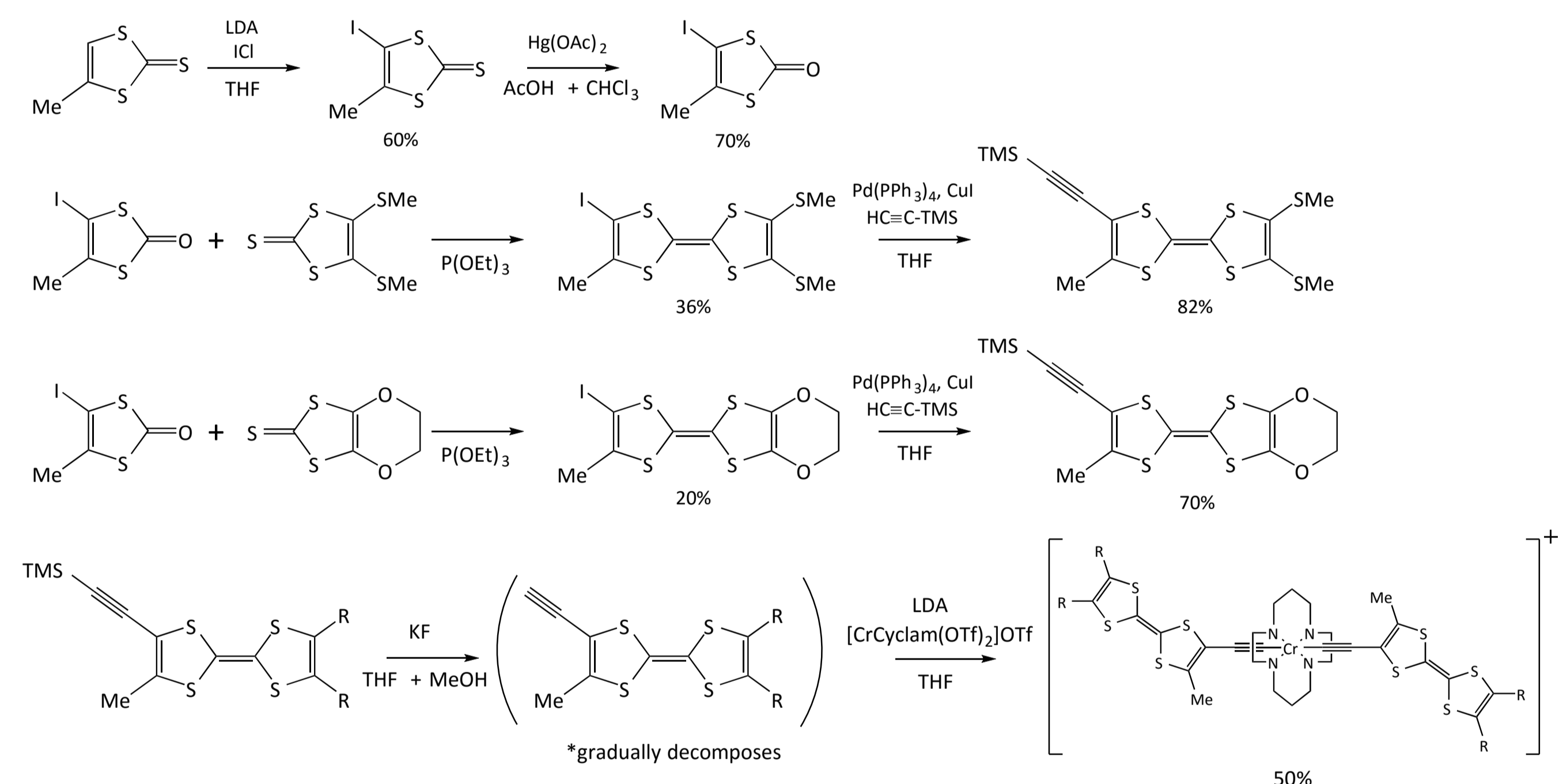


Figure 1. The molecular structures of Cr-acetylide-TTF type complexes.

Here, we report the synthesis of new Cr(III)-acetylide-TTF type complexes, [CrCyclam(C≡C-MeEDO-TTF)₂]ⁿ⁺ and [CrCyclam(C≡C-MeBMT-TTF)₂]ⁿ⁺. The highly soluble functional groups of the complexes (ethylenedioxy and thiomethyl) make it easy to construct molecule-based magnetic materials. We also report the crystal structures and the magnetic properties of the crystals containing the complexes.

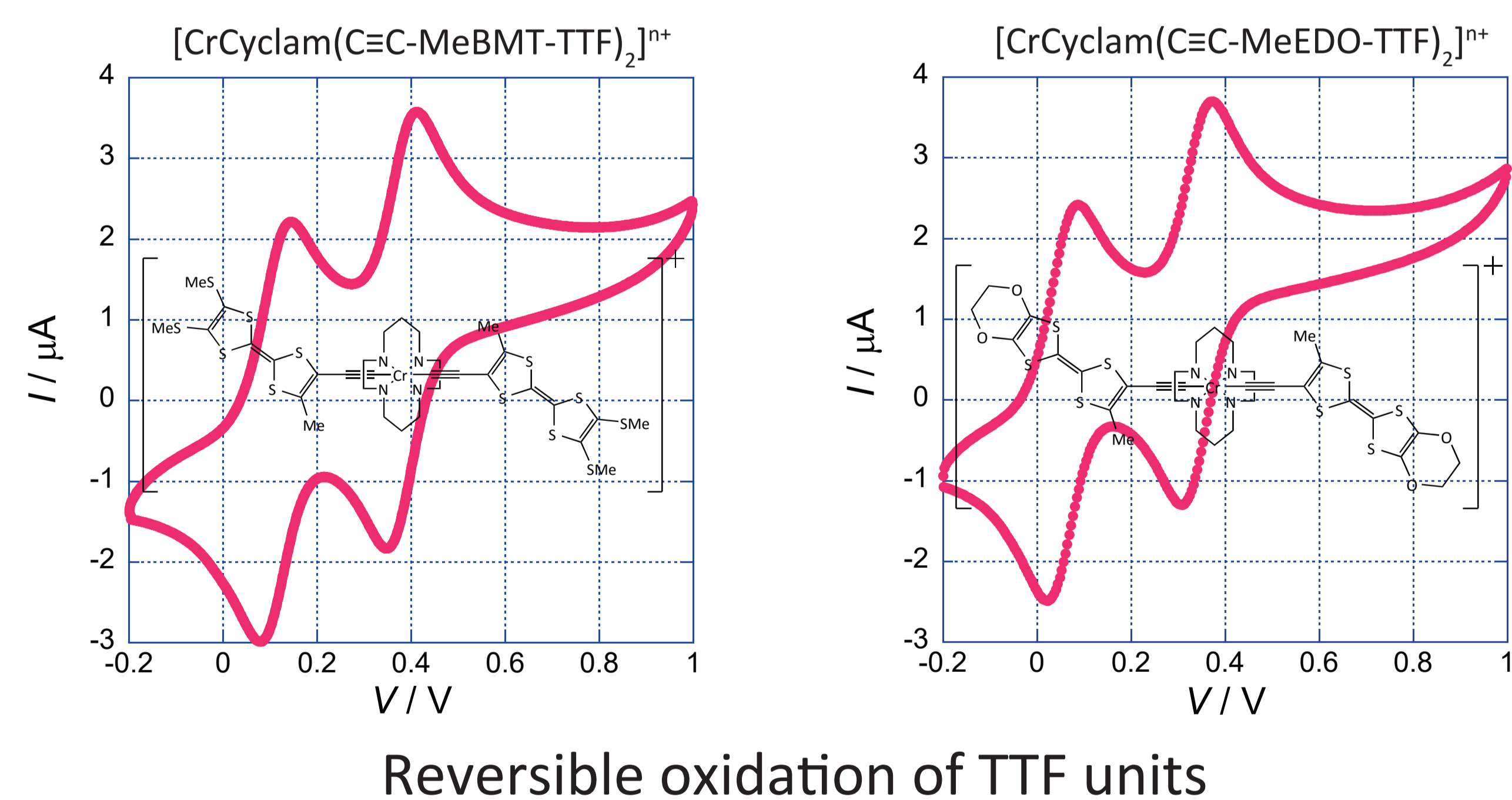
2. Synthesis and CV measurements

Synthesis



Cyclic Voltammetry

0.25 mM, 0.1 M (Bu₄N)ClO₄, acetonitrile, Ag/Ag⁺, 100 mV/s



4. Conclusion

Two new Cr≡C-TTF type complexes were synthesized.

The [CrCyclam(C≡C-MeEDO-TTF)₂]²⁺ salts are characterized by the ferrimagnetic chain of the complex with the strong intra-chain interaction of $2J / k_B = -28$ ([CrPhen(NCS)₄]⁻) and -24 K (ClO₄⁻).

[CrCyclam(C≡C-MeEDO-TTF)₂](ClO₄)₂(PhCl)₂(H₂O)₂ shows a weakferromagnetic transition at 21 K.

Cr≡C-TTF type complexes are promising for molecule-based magnetic materials owing to the strong intra- and inter-molecular interaction through the ethynyl group and the π -stacking of TTF-ligands, respectively.

3. Crystal structures and magnetic Properties

