

Abstract Submitted  
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**Reversible pressure-induced polymerization of  $C_{60}$ ,  $C_{70}$  doped ferrocene** WEN CUI, MINGGUANG YAO, QUANJUN LI, RAN LIU, BO LIU, ZHEN YAO, FENGXIAN MA, BINGBING LIU, Jilin University —  $C_{60}$ ,  $C_{70}$  combined with organometallic donors can form a wide variety of donor-acceptor complexes and only relatively weak van der Waals interactions and charge transfer between them. Ferrocene (Fc) is an example with the tunable degree of charge transfer to  $C_{60}/C_{70}$  and offers us a good model to study the effect of charge transfer on the polymerization of fullerenes. Pressure can modify the intermolecular distance and thus affect the charge transfer between host and guest. It is expected that the interaction can be tuned by applying pressure and further affect the polymerization of fullerenes. In-situ high pressure Raman, IR and XRD studies are used to investigate the phase transitions of  $C_{60}/C_{70}(Fc)_2$ . We find that the charge transfer interaction is strengthened under pressure and the polymer chain is formed in  $C_{60}(Fc)_2$  at 5GPa, while dimer phase and 1D/2D polymers are formed in  $C_{70}(Fc)_2$  at 3GPa and at 8GPa, respectively. Only certain fullerene molecules take part in this reaction due to the layered structure of the samples. These transitions are quite different from those of pure  $C_{60}/C_{70}$  because of the intercalated Fc. The observed polymerization is reversible and can be related to the overridden steric repulsion of counter ions and the tunable charge transfer at high pressure.

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