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**Crystallization kinetics of polyethylene-oxide (PEO) in multi-arm PEO-stars**

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**Introduction:** .In recent years the development of new polymer materials (i.e.: di/triblock copolymers, comb polymers, dendrimers, star polymers, etc.) with well defined molecular weights has made possible the study of polymer crystallization under conditions which were unavailable for common linear polymers. For instance, in block-copolymers, consisting of one amorphous and one crystalline block, microphase separated in the melt, crystallization can take place in the confinement of the amorphous matrix, if the crystallization and glass transition temperature are not too far apart<sup>1</sup>, thus enabling the study of homogeneous nucleation. In crystalline star polymers the crystallization cannot proceed through the star center, inducing an amorphous fraction around the core, leading to an as yet not elucidated crystallization mechanism different from that in linear polymers. Here we present a kinetic study of the crystallization and melting behavior in a range of PEO stars, varying in the number of arms and arm molecular weight, at different crystallization temperatures and compare it with the crystallization and melting behavior of normal linear PEO

**Methods and Materials:** The linear PEO and PEO star crystallization kinetics and melting behavior were studied with a simultaneous SAXS/WAXS setup, using a T-jump cell, consisting of two chambers at different temperatures, one positioned in the X-ray beam, between which the sample could be moved. Equilibration typically took less than 30 seconds. In **Table 1** the arm molecular weights and the number of arms of the samples are displayed.

**Table 1:** sample identity

	SAMPLE	NUMBER OF ARMS	$M_{w,ARM}$
STARS	BC32PEO4	32	4300
	BC16PEO16	16	20400
	BC16PEO6	16	8900
	BC16PEO2	16	3000
	BC8PEO8	8	10000
LINEAR	PEO20K	1	20000
	PEO8.5K	1	8500
	PEO4.5K	1	4500

**References:** G. Floudas, F. Schipper, in preparation