Polyrotaxane

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Polyrotaxane is a supramolecular polymer in which cyclic molecules are threaded onto a linear axle and held there by bulky end groups, so the rings slide and rotate without detaching [1]. Amino-acid-derivatised polyrotaxane conjugates crosslink into slide-ring gels whose pendant groups set the swelling and the mechanics [1]. A one-pot route converts polyisoprene into a polyrotaxane and then into a slide-ring gel without isolating the intermediate [2]. In solid electrolytes, slide-ring mobility governs ion transport and delivers stable cycling against lithium metal [3]. Blends of poly(butylene succinate) with grafted polyrotaxane, made by controlled reactive processing, gain toughness while remaining biodegradable [4]. Slide-ring structures also enter optoelectronic composites, where the movable crosslinks relieve the strain that would crack a conventional network [5].

cyclic molecule threading | slide-ring gel | supramolecular polymer | cyclodextrin | solid electrolyte | movable crosslink

References

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