

Recombinant elastin-like protein polymer for nanotechnological applications

Recombinant amphiphilic diblock protein polymer

Product Number: TP40205

Lot. No. (See product label)

Mol. Weight: Monodisperse recombinant protein containing 457 amino acids and having a molecular weight of 38.5 kDa by MALDI-TOF mass spectrometry.

p.I.: 3.1

Purity: >97% by SDS-PAGE gel

Additional characterization: FT-IR, 1H-NMR (DMSO)

Sequence:

MESLLP-(VPGVG VPGVG VPGEG VPGVG VPGVG)₁₀-(VPAVG)₄₀-V

Description: The monomer unit contains two different functional blocks in order to achieve an adequate balance of amphiphilicity, biocompatibility, pH-responsiveness and thermal response. The first block [(VPGVG)₂VPGEG(VPGVG)₂] confers the pH-responsiveness. The second building block VPAVG is only thermo-responsive.

Source: Microbial production.

Formulation: Sterile lyophilized form (white foam) from a 0.2 µm-filtered solution using deionized ultrapure water.

Preparation Instructions: Lyophilized protein can be reconstituted in water or aqueous buffer solutions up a concentration of 300 mg/mL at cold temperature (4 °C). Other organic solvents: DMF, DMSO, TFE (100 mg/mL).

Storage and Stability: This lyophilized preparation is stable at room temperature, long storage it should be kept at -20 °C. Reconstituted material should be stored in working aliquots at 4 °C for 2 weeks.

Additional information for water-based solutions:

Stimuli-responsiveness and T_t : These protein polymers undergo a phase transition in response to changes in the temperature. Below the so-called inverse transition temperature (ITT) the uncrosslinked polymer chains are soluble in water, however, above the transition temperature (T_t) the polymer chains form microaggregates (acid pH) and nano-objects (neutral pH), which segregate from the solution. This process is monitored by DSC showing a T_t :

| DEIONIZED ULTRAPURE WATER (50 mg/mL) | | |
|---|-----|----|
| pH | 2.5 | 7 |
| T_t (°C) | 32 | 43 |

PBS, pH 7.2 (50 mg/mL): 33°C

The reverse dissolution of the aggregates takes place only after the temperature is undercooled to 15 °C. This degree of large undercooling has been found to be strongly dominated by kinetics, and the acute hysteresis behavior seems to govern the hydration process.

References:

Biomacromolecules, 2012, **13**, 293-298.

Biophysical J., 2009, **97**, 312-320.

Product use limitation: This product is exclusively for *research purposes and in vitro use only*. The product was not tested for administration to humans or animals.

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