matrihealth

ELMA | Application Notes

THIS DOCUMENT PROVIDES IMPORTANT INFORMATION ON THE HANDLING OF ELMA. FOR OPTIMAL RESULTS, PLEASE FOLLOW THE INSTRUCTIONS AND RECOMMENDATIONS IN THIS DOCUMENT.

SOLUBILITY

ELMA is soluble in aqueous buffers or pure water. The solubility of ELMA is tested in double distilled water and phosphate-buffered saline at pH 7.4 (PBS). The tested concentrations are 100 mg/mL (10% w/v) in double distilled water at room temperature and 50 mg/mL (5% w/v) in cold PBS. To dissolve ELMA, use a magnetic stirrer. Vigorous stirring might be required. Add ELMA in small portions to the solvent until the desired concentration is reached. Make sure that the added material is dissolved until the next portion is added. Do not add all of the material at once! This might cause clumping and non-dissolving of the material. Avoid clump formation at all times! ELMA solutions are usually cloudy at high concentrations and of yellowish color.

STORAGE

ELMA powder should be stored at 2 °C - 8 °C, under dry conditions, and protected from light. We guarantee a shelf life of 6 months after the date of production. Solutions of ELMA should be refrigerated. When storing ELMA solutions, especially at higher concentrations, sediment formation might occur. To remove the sediment, stir the solution before using it.

BIOINK FORMULATIONS

ELMA is considered to be used as a component in composite material systems. Since ELMA does not have gelating properties, use ELMA together with a gelating/viscous polymer. We recommend using ELMA in a ratio of ≤50% w/w. ELMA might reduce the viscosity of the material system and Young's Modulus of the photocured product.

matrihealth

ELMA | Application Notes

ELMA/GELMA MATERIAL SYSTEMS

To use ELMA together with GelMA or gelatin/collagen-related materials, proceed as follows:
Dissolve GelMA at 50 °C. Let the solution chill to approx. 30 °C. Add ELMA in small portions under stirring. We recommend an ELMA ratio of 10%-30% w/w and a total protein concentration of 10%-20% w/v depending on the bloom value of GelMA.

PHOTOCURING

ELMA is compatible with all common photoinitiators. However, we recommend using LAP. Depending on the concentration of ELMA, it might increase the opacity of the bioink. Therefore, we recommend increasing the frequency of photocuring to every 1-5 layers.

COACERVATION BEHAVIOUR

Please note that elastin and its derivatives tend to form coacervates. This is favored by high concentrations, high ionic strength, and elevated temperature. Coacervation is characterized by increasing turbidity of the solution. This process is reversible by changing the parameters to lower values. However, maintaining the parameters at elevated values might cause an irreversible aggregation and sedimentation of ELMA. We do not recommend using ELMA at temperatures >30 °C and >100 mg/mL in water or >50 mg/mL in PBS.

TECHNICAL SUPPORT

matrihealth offers technical support for the handling of ELMA. Please contact us at info@matrihealth.com for technical support.