

Supplementary Table S1. FTIR peaks and corresponding functional group

| Film | Functional group | Mode | Wavenumber (cm ⁻¹) |
|---|--------------------|---|--------------------------------|
| Control film | C-O | Stretching | 1026 |
| | | | 1055 |
| | C-O-S | Asymmetrical sulphate stretching | 980 |
| | C-O-S | Symmetrical sulphate stretching | 848 |
| Addition of glycerol and triethyl citrate | C-H | Bending | 1500–1200 |
| | C-O | Stretching | 980–1250 |
| | C=O in ester bonds | Stretching | 1735 |
| | C-OH in O-C=O | Deforming and symmetric stretching | 1425 |
| | HO-C=O | Stretching | 1629 |
| | S=O | Stretching | 1200–1250 |
| | C-O-S | Stretching | 840–845 |
| | O-H | Stretching, intra- and inter-molecular hydrogen bonding | 3000–3700 |
| | C-H | Stretching | 2850–3050 |

Supplementary Table S2. TGA onset temperature, weight loss in each stage of degradation and char residue

| Sample | First stage | | Second stage | | Third stage | | Fourth stage | | Char residue (%) |
|--------------------------------|-------------------------|------------|-------------------------|------------|-------------------------|------------|-------------------------|------------|------------------|
| | T _{onset} (°C) | Wt loss(%) | T _{onset} (°C) | Wt loss(%) | T _{onset} (°C) | Wt loss(%) | T _{onset} (°C) | Wt loss(%) | |
| Control | 52.3 | 28.5 | 206.4 | 31.2 | 574.7 | 9.3 | 724.0 | 9.5 | 21.5 |
| 20% glycerol | 52.2 | 32.3 | 206.7 | 39.2 | 574.8 | 9.7 | 724.8 | 7.1 | 11.7 |
| 30% glycerol | 52.2 | 33.1 | 206.7 | 40.9 | 574.7 | 9.2 | 724.8 | 7.0 | 9.7 |
| 20% triethyl citrate | 52.2 | 31.1 | 207.2 | 32.2 | 575.5 | 10.9 | 725.7 | 8.9 | 16.9 |
| 30% triethyl citrate | 52.2 | 30.3 | 207.7 | 32.3 | 575.5 | 11.4 | 725.7 | 8.8 | 17.2 |
| 20% glycerol/ triethyl citrate | 51.7 | 31.4 | 207.7 | 35.7 | 575.0 | 10.0 | 724.8 | 8.7 | 14.2 |
| 30% glycerol/ triethyl citrate | 52.2 | 31.0 | 207.2 | 39.9 | 574.7 | 10.7 | 725.3 | 7.8 | 10.6 |