**Tables and Figures – solvent paper**

**Table 1:** Partition coefficient (log P) and solubility (log S) calculated with ChemDraw software for all monomers and solvents used in this study.

|  |  |  |
| --- | --- | --- |
| Monomer or solvent | logP | logS |
| Water | - | 0.158 |
| Ethanol | 0.07 | 0.3046 |
| Ethyl acetate | 0.29 | -0.5017 |
| BisGMA | 5.09 | -5.571 |
| HEMAM-BDI | 2.37 | -4.312 |
| DMAM | 0.2 | -0.3436 |

**Table 2.** Modulus of elasticity (GPa) and yield strength (MPa) tested dry and after 7 days storage in water (wet) for all tested experimental groups. HEMAM-BDI specimens could not tested after water storeage. Values followed by the same superscript within the same column are statistically similar (two-way ANOVA within column). The asterisk symbol \* indicates statistical difference between dry and wet results for the same group (t-test). For all tests, α=5%.

|  |  |  |
| --- | --- | --- |
| Solvent | BisGMA | HEMAM-BDI |
| Type | Concentration (wt%) | Yield strength (MPa) | Flexural modulus (GPa) | Yield strength (MPa) | Flexural modulus (GPa) |
| dry | wet | Reduction (%) | dry | wet | Reduction (%) | dry | dry |
| Control | **0** | **78.1±14.4 b** | **48.2±2.1 b\*** | **38** | **3.55±0.10 b**  | **2.31±0.20 b\*** | **35** | **51.5±14.0 b** | **5.40±0.59 a** |
| EtOAc | **2** | **85.8±12.9 ab** | **42.3±3.3 b\*** | **51** | **3.42±0.34 b** | **2.13±0.23 b\***  | **38** | **70.1±6.3 a** | **4.89±0.31 ab** |
| **5** | **71.4±3.8 bc** | **45.8±5.0 b\***  | **36** | **3.17±0.22 bc** | **2.19±0.18 b\***  | **31** | **70.1±14.8 a** | **4.94±0.44 a**  |
| **15** | **76.0±3.0 b** | **53.7±7.6 b\*** | **29** | **3.18±0.07 bc** | **2.82±0.43 b** | **11** | **86.5±21.0 a** | **5.10±0.17 a**  |
| **20** | **63.0±5.8 c**  | **53.5±5.7 b** | **15** | **2.77±0.41 c** | **2.90±0.48 b** | **-5** | **70.1±8.7 a** | **4.57±0.81 bc** |
| EtOH/H2O | **2** | **101.3±6.6 a** | **87.2±13.8 a** | **14** | **4.64±0.47 a** | **4.23±0.47 a** | **9** | **68.1±7.0 ab** | **5.01±0.65 a**  |
| **5** | **89.7±3.7 ab** | **88.1±5.4 a** | **2** | **4.25±0.44 a** | **4.10±0.27 a** | **4** | **53.9±17.5**  | **5.16±0.36 a** |
| **15** | **64.3±9.2 c** | **55.2±10.3 b** | **14** | **3.31±0.61 b** | **2.59±0.36 b** | **22** | **62.2±15.3 ab**  | **3.97±0.34 c** |
| **20** | **54.0±5.4 c** | **52.6±3.4 b**  | **3** | **3.00±0.35 bc** | **2.89±0.11b** | **4** | **47.9±13.4 b**  | **3.20±0.12 c** |



**Figure 1.** Chemical structure of the newly synthesized secondary dimethacrylamide – HEMAM-BDI (MW = 502.61g/mol).



**Figure 2.** Degree of conversion (%) as a function of time (up to 60 s) for BisGMA- and HEMAM-BDI-based materials, containing different concentrations of ethyl acetate (EtOAc, solid lines) or Ethanol/H2O (EtOH/H2O, dashed lines). Dashed red lines on the HEMAM-BDI graph are highlighting the two-stage kinetic profile for the groups with highest solvent concentrations. Vinyl conversion was followed in real time as the materials were photocured with 250 mW/cm2 for 300 seconds.



**Figure 3.** Averages of maximum rates of polymerization (Rpmax, %.s-1), degree of conversion at Rpmax (DC at RP, %) and degree of conversion at 5 min (DC at 50 min, %), for all groups tested. BisGMA-based materials were statistically different from HEMAM-BDI-based materials for every variable, so comparisons were made only within each monomer system, using two-way ANOVA/Tukey’s test (solvent type and concentration as factors, α=5%). Values followed by the same superscript or connected by a horizontal bar are statistically similar. Vinyl conversion was followed in real time as the materials were photocured with 250 mW/cm2 for 300 seconds.

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**Figure 4.** Linear regression curves for: (A) the final degree of conversion (DC) (%), (B) maximum rate of polymerization (Rpmax) (%.s-1), and (C) degree of conversion at maximum rate of polymerization (DC at Rpmax) (%) as a function of solvent percentage incorporated in the mixtures for BisGMA and HEMAM-BDI resins.



**Figure 5.** Polymerization rate (%.s-1) as a function of conversion (%) for BisGMA- and HEMAM-BDI-based materials, containing different concentrations of ethyl acetate (EtOAc, solid lines) or Ethanol/H2O (EtOH/H2O, dashed lines). Vinyl conversion was followed in real time as the materials were photocured with 250 mW/cm2 for 300 seconds.

**Figure 6. Schematic representation of a secondary methacrylamide with the two dipoles: carbonyl (C=O) and amine (N-H) and the potential hydrogen bonds. (*Adapted from*** *De Ruiter2005).*