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1 **Synthesis, characterization and non-isothermal decomposition kinetic of a**
2 **new galactochloralose based polymer**

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12
13 **Abstract**

14 A glycopolymer, poly(3-*O*-methacroyl-5,6-*O*-isopropylidene-1,2-*O*-(*S*)-trichloroethylidene-
15 α -D-galactofuranose) (PMIPTEG) was synthesized from the sugar-carrying methacrylate
16 monomer, 3-*O*-methacroyl-5,6-*O*-isopropylidene-1,2-*O*-(*S*)-trichloroethylidene- α -D-
17 galactofuranose (MIPTEG) via conventional free radical polymerization with AIBN in 1,4-
18 dioxane. The structures of glycomonomer and their polymers were confirmed by UV-Vis,
19 FT-IR, ¹H-NMR, ¹³C-NMR, GPC, TG/DTG-DTA, DSC, and SEM techniques. SEM images
20 showed that PMIPTEG had a straight-chain length structure. On the other hand, the thermal
21 decomposition kinetics of polymer were investigated by means of thermogravimetric analysis
22 in dynamic nitrogen atmosphere at different heating rates. The apparent activation energies
23 for thermal decomposition of the PMIPTEG were calculated using the Kissinger, Kim-Park,
24 Tang, Flynn-Wall-Ozawa (FWO), Kissinger-Akahira-Sunose (KAS) and Friedman methods
25 and were found to be 100.15, 104.40, 102.0, 102.2, 103.2 and 99.6 kJ/mol, respectively. The
26 most likely process mechanism related to the thermal decomposition stage of PMIPTEG was
27 determined to be a D_n Deceleration type in terms of master plots results.

28 **Keywords:** Carbohydrate based polymer, chloralose, thermal analysis, decomposition kinetic,
29 methacrylate.

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