

# Accepted Manuscript

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PII: S0141-3910(14)00275-4

DOI: [10.1016/j.polymdegradstab.2014.07.015](https://doi.org/10.1016/j.polymdegradstab.2014.07.015)

Reference: PDST 7404

To appear in: *Polymer Degradation and Stability*

Received Date: 9 May 2014

Revised Date: 2 July 2014

Accepted Date: 16 July 2014

Please cite this article as: N. K S, Bijwe J, Varma IK, Thermal behaviour of bis-benzoxazines derived from renewable feed stock 'vanillin', *Polymer Degradation and Stability* (2014), doi: 10.1016/j.polymdegradstab.2014.07.015.

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**Thermal behaviour of bis-benzoxazines derived from renewable feed stock ‘Vanillin’**Sini N. K <sup>a</sup> Jayashree Bijwe<sup>a</sup> and Indra K. Varma<sup>b\*</sup>

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**Abstract**

Several bis-benzoxazine monomers (Va-BBz)s were synthesized using a naturally occurring phenol: vanillin, different diamines such as ethylene diamine (EDA), diaminodiphenyl sulphone (DDS), diaminodiphenyl ether (DDE), diaminodiphenyl methane (DDM) and 2,2'-bis [4-(4-aminophenoxy)phenyl] propane (BAPP) and paraformaldehyde. The structure of the bis-benzoxazine monomers was characterized by FT-IR, <sup>1</sup>H and <sup>13</sup>C NMR. The effect of structure on curing behaviour and thermal properties was evaluated by differential scanning calorimetry (DSC) and thermogravimetric analysis (TGA). The poly(bis-benzoxazine)s derived from vanillin had high *T<sub>g</sub>* (202-255°C), high char yield (52-76%) and excellent thermal stability due to highly cross-linked nature of the polymer. Adhesive strength of cured resins (i.e. poly(Va-BBz)s) were also evaluated at 200 °C.

**Key words:** bis-benzoxazine; vanillin; thermal degradation; curing behaviour; adhesive strength.

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