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Thermal Properties of SAN matrix with PTFE Particle reinforced compositor

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ABSTRACT

Temperature use of composite materials relies upon their warm conductivity and co-productive of warm development. Polymers are exceptionally burnable because of their structure and their powerlessness to satisfy a couple of uses. The essential purpose of this examination work is to recommend the effect of Polytetrafluroethylene polymer (PTFE) as molecule with Styrene Acrylonitrile polymer (SAN) as grid to inspect its warm properties. Tests of 100% SAN and 10% PTFE by weight, 20% PTFE by weight mixed examples with SAN are arranged effectively by Injection shaping procedure. Warm treatment of mollify polymer can control polymer structure (fitting) and as such choosing its warm lead because of the readiness of the set up utilizing the infusion forming creation process. Warmth limit, Thermal extension, Thermal conductivity and Thermal corruption are the warm properties inspected. From the perceptions it was discovered that PTFE particles mixed examples displayed most extreme warm conductivity and great dimensional soundness. The PTFE molecule was effectively strengthened with ABS copolymer grid utilizing infusion shaping strategy. The created PTFE filled (10% by weight) ABS polymer composites displayed greatest warm conductivity – 0.162 W/mK than unadulterated ABS copolymer. The composite strengthened by (20% by weight) PTFE particles displayed most extreme coefficient of direct warm development – 8.84X10-5/˚C than unadulterated ABS.PTFE filled polymer composites having greatest warm conductivity is because of the nearness of small scale structures of PTFE particles which can move more warmth between the atoms

Key Words- Acrylonitrile polymer (SAN) , Polytetrafluroethylene polymer (PTFE)
Warm Properties ,Thermal conductivity , soundness.

1.1Thermal Conductivity Analysis

The heat energy (Q) move over a plane of territory (A), with a temperature slope (ΔT/Δl) can be communicated as Q = kA (ΔT/Δl), where k is the warm conductivity of the material. The unit for „k" is W/m-K and for polymers its incentive in the request for 0.3. As examples with breadth of 50mm and thickness of 3mm are utilized for estimating warm conductivity under consistent state condition.

1.2Thermal expansion coefficient analysis

Linear coefficient of thermal expansion (α) is the adjustment long per unit by the expansion of warmth vitality given by α = ε/ΔT, where ε is the strain. The unit for warm development co-productive is ˚C-1 and its qualities for polymers in the request for 50 to 400 x 10-6.The materials having solid nuclear bonds have high dissolving point and low warm extension coefficients. Dilatometer instrument was utilized to gauge the warm extension coefficient.

Table: 1.1 SAN and SAN/PTFE composites

S.No.	**samples**	**$T_{-5\,wt.\%}$ degradation**	**$T_{-50wt.\%}$ degradation**	**T_{max} (˚C)**
	Sample 1 Pure SAN	382	415	495
	SAN + 10% PTFE	384	420	445

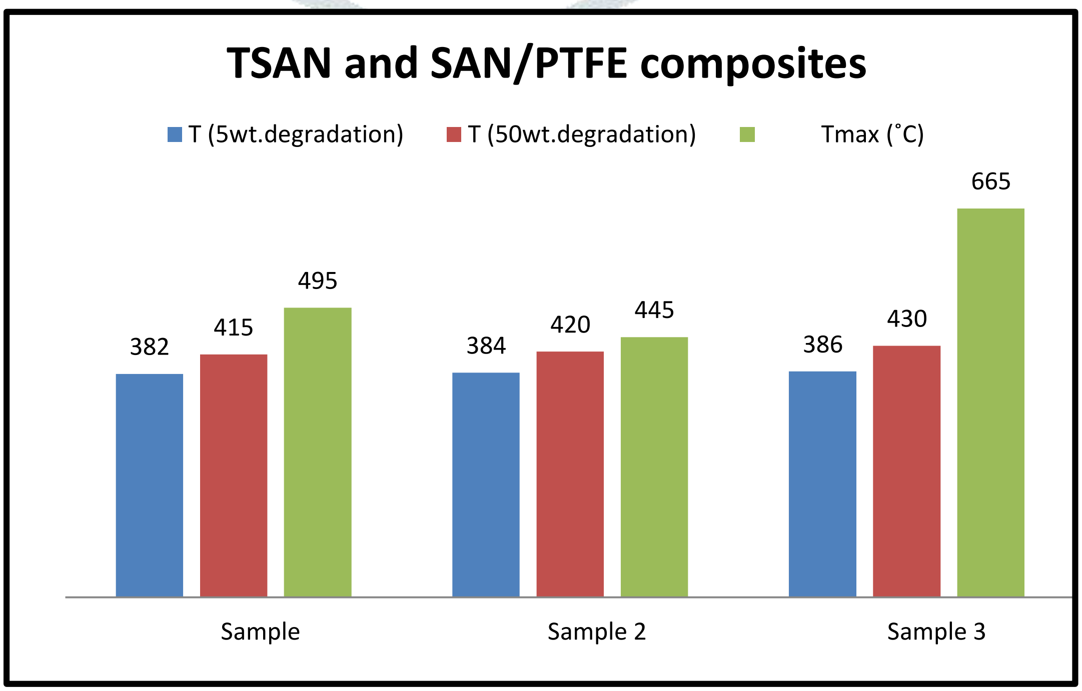

Figure: 1.1 SAN and SAN/PTFE composites

The warm decay bends for SAN/PTFE molecule composites withstand higher temperature go than SAN test. This upgrade is because of the physical defensive hindrance of the PTFE particles on a superficial level layer of the grid. The PTFE molecule carries on as warm gatekeeper to the unpredictable materials created during the warm decay because of higher warm soundness. By physical changes, the adsorption of vaporous substances on tests, for example, dynamic charcoal buildup at 700˚ C is less The PTFE fiber fortified SAN polymer composites manufactured effectively by infusion forming process have higher warm conductivity and low warm diffusivity than existing individual copolymer.

1.3 Thermal performance of abs copolymer blended with ptfe particle/polymer composite

Acrylonitrile Butadiene Styrene (ABS) polymer and Polytetrafluroethylene (PTFE) polymer have various properties. ABS as network and PTFE as molecule support when made as composite shows properties varying from both thermal conductivity and Coefficient of direct warm extension esteems for any composite decide its higher

temperature usage. ABS is a copolymer containing butadiene, styrene and acrylonitrile. This exploration work does an investigation of the warm property of ABS copolymer through expansion of PTFE as molecule utilizing composite development. Examination shows PTFE fitting into an ideal molecule fortification material for a wide variety of uses. Tests of 100% ABS and 10% PTFE by weight, 20% PTFE by weight mixed examples with ABS were arranged effectively utilizing the liquefy condition utilizing Injection shaping procedure. Decision of the ABS copolymer framework and PTFE molecule fortification for the examination work, prompted the accomplishment of improved warm properties of the ABS polymer composite. Exploratory outcomes shows PTFE filler included composites displaying high warm conductivities and great coefficient of straight warm extension contrasted with unadulterated ABS copolymer. The warm testing of ABS polymer composites is a fundamental procedure for item plan; advancement and assembling process.

1.4 Thermal Conductivity Analysis

Heat capacity is described as the proportion of warmth vitality fundamental to convey an expansion of unit temperature. Warmth limit is given as $C = dT/dQ$, Where dQ is the vitality fundamental to build the temperature by dT. Warm conductivity is the warmth limit of a polymer composite for move of warmth vitality on a superficial level through temperature inclination. The warmth vitality „Q‟ moved over a surface of territory „A‟ with a temperature inclination $\Delta T/\Delta l$ can be spoken to as $Q = kA (\Delta T/\Delta l)$, with k as the warm conductivity of the polymer composite example. As showed by ASTM

E1530 circle shape, polymer composite examples with range of 25mm and thickness of 3mm are used for warm conductivity estimations. A foreordained consistent state heat is provided through one surface of the test example.

Warm conductivity is the property portraying the limit of the ABS composite materials to trade heat. The warm conductivity of the ABS composite is dependent on

components, for example, Polymer-filler interface and filler attributes, relies upon the specific kind and state of the filler included [66]. The gained results lead to the examination of ABS composites filled by (10% Wt) PTFE molecule demonstrating 3% expansion in warm conductivity. The ABS composites filled by (20% Wt) PTFE likewise demonstrated 2.5% addition in warm conductivity than test 1 ABS

Table: 1.2Thermal conductivity for ABS and ABS/PTFE composites

S.No.	Samples	Linear Thermal Expansion
1.	Sample 1 ABS	0.155
2.	Sample 2 ABS + 10% PTFE	0.160

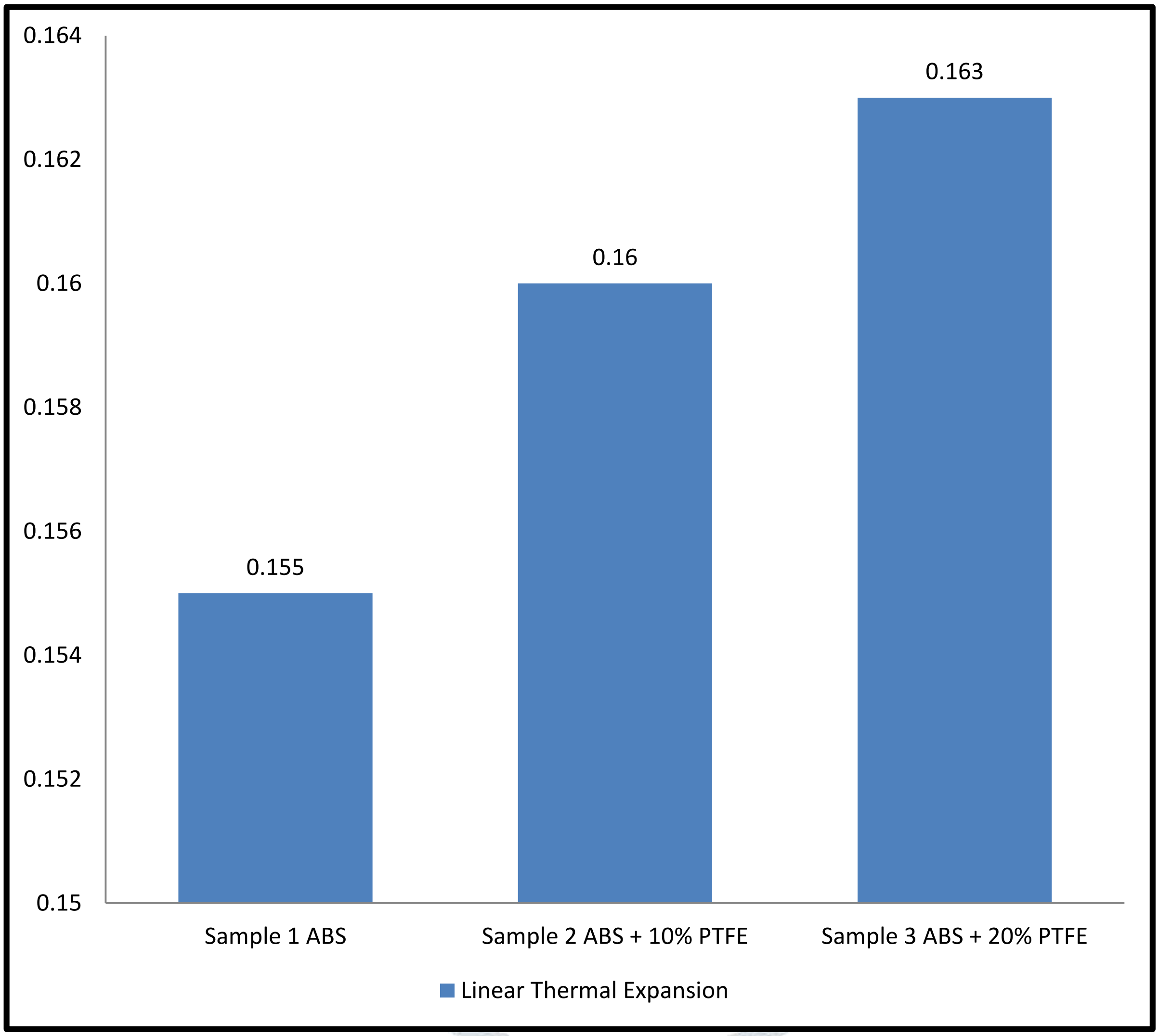

Figure: 1.2Thermal conductivity for ABS and ABS/PTFE composites

1.5 Coefficient of Linear Thermal Expansion

Composites grow when warmed inside a constrained temperature run during which no stage change happens. The warmth included expands the vibrations of the iotas in the material, which, thusly, builds the normal detachment between the molecules. The relative extension (likewise called strain or warm pressure disappointment) over the adjustment in temperature is known as polymer's coefficient of direct warm development. The example with length „L" is fitted in a steam shower at a gradual temperature ΔT, the adjustment long ΔL, is legitimately relative to „L" and

ΔT. Consequently, $\Delta L = \alpha.L.\Delta T$ Where α is known as the coefficient of straight warm extension for the material.

The results of preliminaries show the expansion of PTFE particles with ABS framework constructing the coefficient of straight warm development. The filler PTFE reinforces the grid and removes it from growing and just happens inside restricted temperature run.

The PTFE molecule was effectively strengthened with ABS copolymer grid utilizing infusion shaping strategy. The created PTFE filled (10% by weight) ABS polymer composites displayed greatest warm conductivity – 0.162 W/mK than unadulterated ABS copolymer. The composite strengthened by (20% by weight) PTFE particles displayed most extreme coefficient of direct warm development – 8.84X10-5/˚C than unadulterated ABS.PTFE filled polymer composites having greatest warm conductivity is because of the nearness of small scale structures of PTFE particles which can move more warmth between the atoms. The minute examination guarantees t **REFERENCES**

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