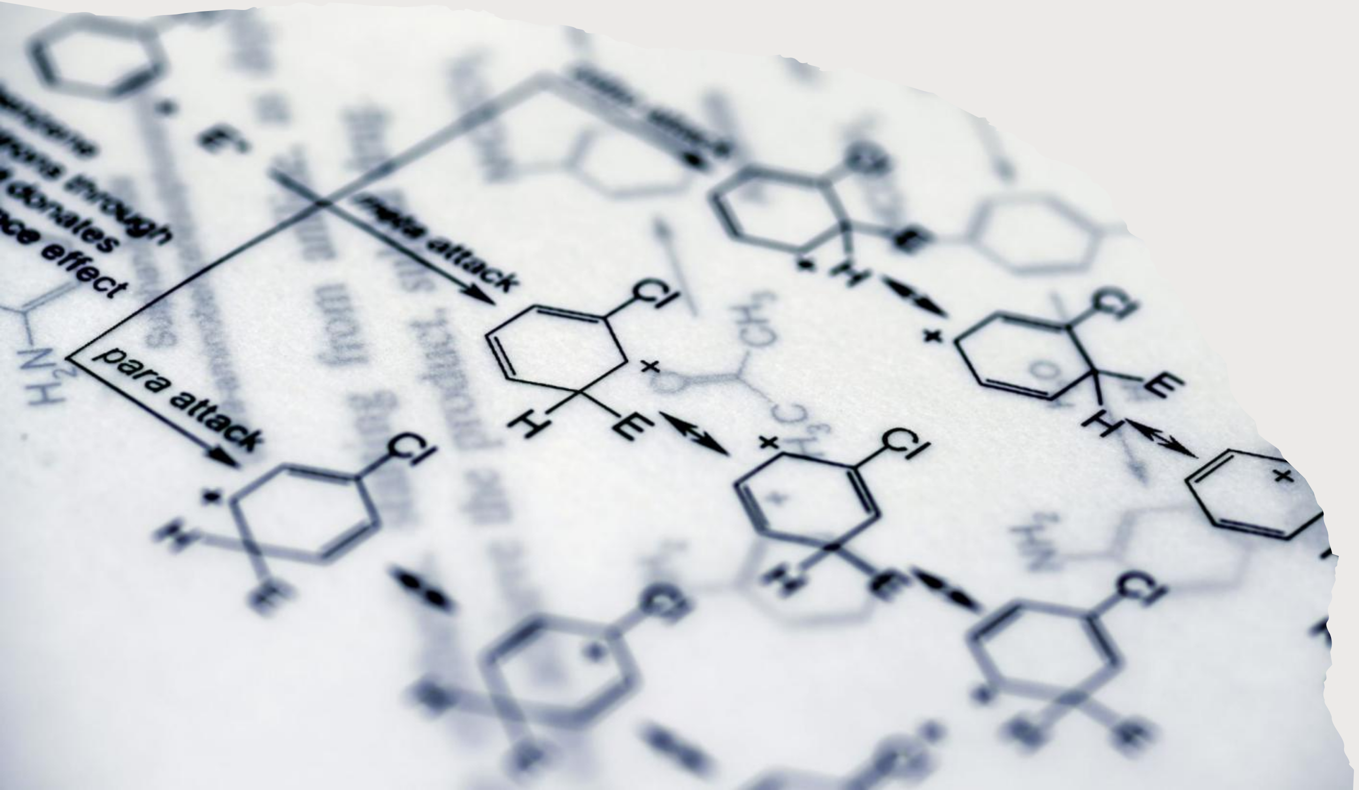
Mehmet KONYAR, Ph.D.

Senior Materials Scientist / R&D Project Leader

Advanced Materials | Energy | Composites | Defense-Relevant Technologies

Purpose: Demonstrate technical decision-making, scale-up leadership, and commercialization impact.

Technical Focus & Value Proposition



Materials Domains

- Polymer systems (PDMS, thermosets, sustainable/vitrimer-type resins)
- Glass & carbon fiber reinforced composites
- Solar materials: ingot, wafer, thin film/c-Si/CIGS solar cells, modules

What I Deliver

- Translation of lab-scale materials into manufacturable products
- Leadership of multi-disciplinary R&D programs under industrial constraints

Career Trajectory

PL, Composites @ Kordsa

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PL, TFPE @ Kordsa

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R&D Supervisor @ Kalyon PV

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R&D Engineer @ Kalyon PV

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Materials Engineer @ Sensobright

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Postdoctoral Researcher @ ITU

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Research Assistant @ GTU

- Team size growth
- TRL progression
- Manufacturing exposure

Academic Background

•Lab-scale process development (e.g., tape casting)

•Full performance testing with material characterization and environmental techniques by employing real pollutants (azo dyes, pesticides)

•Peer-reviewed publications on selected journals

•Oral presentations at international events

Case Study 1: Solar Ingot & Wafer Technologies

Context: Integrated solar manufacturing environment

Problems Addressed:

- Yield and performance optimization
- Technology transition constraints

Technical Actions:

- Ga & P doped ingot evaluations
- M10 technology assessment
- Process optimization under fixed infrastructure

Impact:

- Improved manufacturability
- Supported downstream module integration

Case Study 2: End-to-End Solar Manufacturing

Scope: Ingot → Wafer → Cell → Module

Responsibilities:

- Cross-department project coordination
- Localization of critical solar materials
- R&D center administration

- **Value Created**:
- Reduced supply-chain dependency
- Faster commercialization readiness

Case Study 3: Printed Electronics

Scope: Developing a novel business area on flexible electronics for industrialization

- Material stack selection
- Process compatibility
- Pilot validation mindset
- Avoid marketing-style visuals.

Achievements:

- Ready-to-commercialize prototype deliverd by a funded project
- Local supply chain resolved and Kordsa progressed as the functional inks supplier

Case Study 4: Thin Films for PV

Scope: Developing a novel business area on solar for industrialization

- Start-up search for investment
- Technical support to DD processes
- Technical viability check
- Market assessment studies
- Feasibility runs for new manufacturing lines

Achievements:

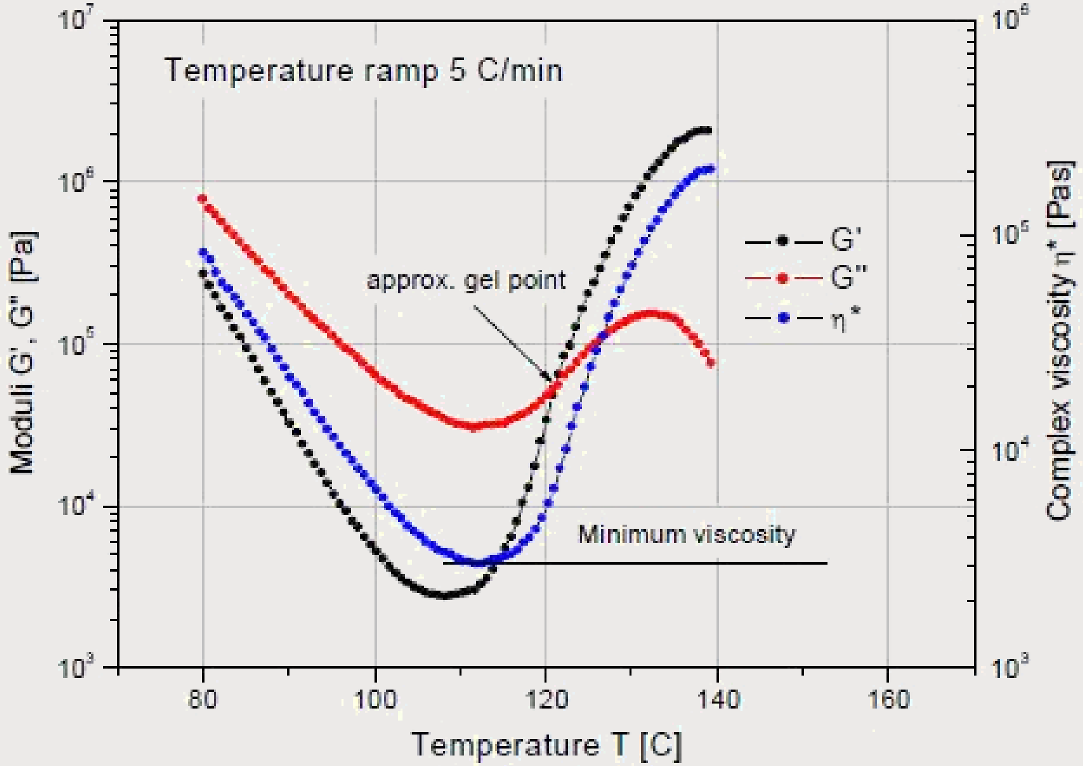
- Collaboration with Toledo Solar for CdTe manufacturing

Case Study 5: Composite & Prepreg Technologies

- **Application**: Glass/carbon fiber reinforced prepregs
- **Challenges**:
- Resin flow vs. fiber wet-out
- Pilot-to-mass consistency
- Aerospace-adjacent performance requirements
- **My Role**:
- Resin system selection
- Scale-up strategy
- Pilot production oversight

Resin Systems

Objective: Design resin systems that balance processability, thermal–mechanical performance, and scalability for composite prepregs.



Technical Requirements

- Processing temperature window compatible with pilot and mass-scale impregnation lines
- Sufficient flow for fiber wet-out without excessive bleed
- High post-cure Tg for structural applications
- Compatibility with glass and carbon fiber reinforcements

Resin System Design Considerations

Cure Chemistry: Thermoset-based systems with controlled crosslink density

Network Architecture: Trade-off between rigidity (Tg) and flow (viscosity)

Additive Strategy: Modifiers for toughness, latency, and processing stability

Rheology vs. Impregnation

- Low viscosity required during impregnation stage
- Rapid viscosity build-up avoided to ensure uniform wet-out
- Controlled gelation to prevent void formation and fiber wash

Thermal–Mechanical Balance

- Tg targeted above service temperature
- Cure profile optimized to avoid residual stresses
- Mechanical integrity maintained after thermal cycling

Sustainability & Industrial Constraints

- Evaluation of recyclable / sustainable resin concepts
- Impact of sustainability modifications on Tg, flow, and durability
- Cost and supply-chain robustness considered during formulation selection

Scale-Up & Risk Mitigation

- Lab validation → pilot trials → production readiness
- Sensitivity to processing variability assessed
- Qualification mindset aligned with aerospace-adjacent requirements

Scale-Up & Manufacturing Readiness

- Lab → pilot → mass
- Process robustness
- Supplier qualification
- Repeatability concerns

Leadership & Program Management

- Teams managed 10-15 including engineers & technicians
- Budget responsibility (1k – 200k USD)
- Funded project administration (e.g., NANOSİS)
  - Director of research groups
  - Follow-up of scientific achievements, staff changes, fellowships, financials

NANOSIS
PLATFORM

Confidentiality & Industrial Rigor

- Full collaboration with legal departments: all communications are conducted written and reported
- IP-sensitive developments: Patent applications under processing
- NDA-driven work: all communications conducted under NDA
- Defense/aerospace-aligned rigor: all processes conducted aligned with related standard methods (Boeing & Airbus methods).

Summary & Discussion

Key Takeaways:

- Rare combination: solar + composites + polymers
- Proven scale-up and commercialization leadership
- Ready for senior technical roles

"Discussion welcome."