WORKSHOP

ALTERNATIVES TO POLYOLEFINS

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WORKSHOP OVERVIEW

Some polymers you can mold now

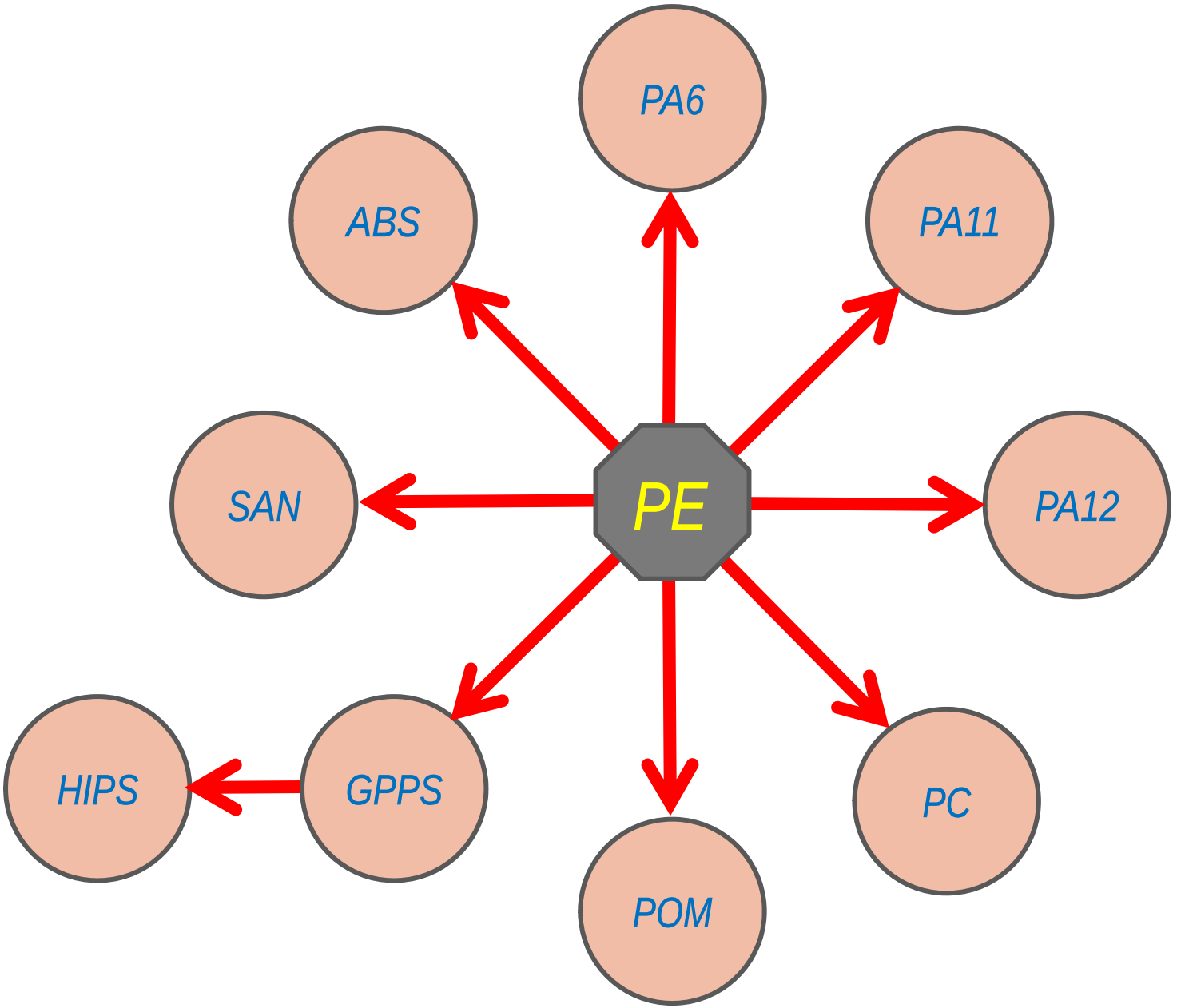
Some polymers that may be moldable

Common factors & issues

Effects of gases on impact modified PA6

Conclusions & information sources

“Touchy-feely”


PA6
ABS
PA11
SAN
PE
PA12
HIPS
GPPS
PC
POM

SOME COMMON FACTORS & ISSUES

Moldability / ability to sinter properly

Melting point / glass transition temperature

Density / shot weight

Brittleness (at RT and near-zero)

Dimensional control, release & shrinkage

Water vapor absorbtion / need to pre-dry / post-treat

Heat & light stability

Getting rid of bubbles

Price of base polymer / cost of grinding & packaging

MOLDABILITY / ABILITY TO SINTER PROPERLY

Rotomolding is a zero shear process

Injection molding is a high shear process

Many I/M grades simply won't flow & sinter

Melt Index isn't measured or stated for many polymers

Melt Volume Rate can be used to estimate MI

Trial & error is often the only way

"RotoRocket" is a great tool

MELTING POINT / GLASS TRANSITION TEMPERATURE

Semi-crystalline polymers have a T_m

Amorphous polymers don't – look at T_g instead

T_m or T_g too high for roto ovens?

High temperature means fast degradation

Still need a sintering stage

Establish suitable PIAT by trial & error

SEMI-CRYSTALLINE POLYMERS

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AMORPHOUS POLYMERS

PC

GPPS

HIPS(?)

SAN

ABS(?)

DIMENSIONAL CONTROL, RELEASE & SHRINKAGE

Semi-crystalline polymers shrink

Makes demolding easy!

Familiar compared to PE

Makes dimensional control difficult!

Amorphous polymers don't shrink

Makes demolding scary!

Makes dimensional control easier!

Speeds up cooling!

Multi-part tool designs?

All materials release OK with standard MRA

Excess MRA can retard pick-up

Semi-crystalline:
PA6
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Amorphous:
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HIPS(?)
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PRICE OF BASE POLYMER
COST OF GRINDING / PACKAGING

Unusual polymers likely to have a higher price tag

Selling prices up to PE x 12!

Cryo grinding can cost ambient x 5

Extrusion step for addition of stabilizers?

Barrier packaging for air / moisture exclusion

Higher density materials cost more per unit thickness

Extra cost of scrap / disposal

CONCLUSIONS

PE is a hard act to follow

New materials bring complications

Need to upgrade roto process control

Ancillary equipment may be required

Need to build a different value proposition

Need to continue materials R&D

HUNGRY FOR MORE INFORMATION?

Exisiting suppliers

ARM “ABC’s” booklets

ARM webinars

ARM blogposts

Future ARM manual

Watch this space!