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Trekking on hills and valleys in the polymorph landscape of TPB  
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TPB (1,1,4,4-tetraphenyl-1,3-butadiene) is a luminescent molecule that displays luminescence also in the crystalline state, if favorably packed by aligning the transition dipoles in the correct orientation. TPB is currently known in three polymorphs α, β, γ [1], and TPB molecular structure approximately displays C2 point symmetry in the α form, and C1 point symmetry in β and γ. Among these the β form has proved to be best suited to photoluminescence; unfortunately its crystallization is not reproducible. The γ form, structurally very similar to the β polymorph, is also rarely obtained. It is therefore advisable to develop new crystal forms of TPB (polymorphs, co-crystals, solvates) by using the tools of crystal engineering in order to optimize photoluminescence for the design of light emitting or photovoltaic devices.

We have explored the polymorph landscape of TPB by several techniques, such as crystalization solvent screening, gel crystallization, temperature controlled precipitation, melt quenching, recrystallization by seeding from the melt, sublimation, affording mostly the commercial form, and sometimes the less stable polymorph, is also rarely obtained. It is therefore advisable to develop new crystal forms of TPB (polymorphs, co-crystals, solvates) by using the tools of crystal engineering in order to optimize photoluminescence for the design of light emitting or photovoltaic devices.

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