Table 1. Parameter and results of thermal lens measurements of different substrates. The quantity $|\varepsilon_2| = a_2 \cdot P$ was shown to depend exclusively on material parameters (see Eq. (12)).

substrate			beam diameter (μm) at center of substrate	max. Power (W)	fitting parameter			focal length ($\mathrm{m}\cdot\mathrm{W}/P$)
material	length (mm)	position x			a_0 (10^{-3})	a_1 (10^{-5})	a_2 (10^{-3})	
BK7 (N-BK7)	5	-5.03	854	108	1.384	1.257	1.347	1031 ± 231
PBS (flint glass)	15	-5.87	991	128	1.485	2.896	1.871	776 ± 25
AOM (TeO_2)	31	-5.49	914	122	0.419	-0.205	0.167	7404 ± 475
LBO (LiB_3O_5)	50	-1.93	170	119	no measurable thermal lens effect			
PPKTP	28	-0.91	111	124	no measurable thermal lens effect			
Faraday (TGG)	40	-6.24	1036	75	1.182	-9.895	4.332	365 ± 11
LN (5 mol% Mg: $LiNbO_3$)	21	-5.28	887	41	thermal lens not measurable due to photo-refractive effect			
RTP (Y-cut $RbTiOPO_4$)	40	-5.38	903	133	19.879	0.435	0.445	2722 ± 206

The measurement technique shown in this paper measures directly the mode conversion coefficient $|\varepsilon_2|$ of a thermal lens. This parameter was introduced and was shown to depend exclusively on material parameters. An expansion of the beam into the eigenmodes of an optical cavity allows us to measure the mode conversion coefficient directly. The validity of the presented measurement technique was demonstrated by measuring an optical lens. An independent measurement using a CCD camera showed good agreement to the cavity scan method.

Additionally, we measured the thermal lens of several commonly used optical components. The weakest thermal lens had a focal length of 7404 $\mathrm{m}\cdot\mathrm{W}/P$ and was created in an AOM crystal.

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